12/11/96 copy To RCRA file

DEC 1 1 1996

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Samuel Waldo
Director of Environmental Affairs
Amphenol Corporation
358 Hall Avenue
P.O. Box 5030
Wallingford, Connecticut

DRE-8J

RE: Administrative Order On Consent
(Dated November 27, 1990)
Franklin Power Products/Amphenol
IND 044 587 848

Dear Mr. Waldo:

The United States Environmental Protection Agency (U.S. EPA) has determined that the reports titled "Report of a Corrective Measures Studies for the Former Amphenol Facility, Franklin, Indiana", as revised September, 1995, and "Report of Additional Corrective Measures Studies for the Former Amphenol Facility, Franklin, Indiana", as revised November, 1996, which constitute the Corrective Measures Study (CMS) report for the above referenced facility, are acceptable for public review and comment. In addition, U.S. EPA has reviewed the supplemental report for the RCRA Facility Investigation (RFI) "Report of Shallow Groundwater Sampling Along Hurricane Creek, Former Amphenol Facility, Franklin Indiana", dated November, 1996, and hereby approves this report.

As noted in U.S. EPA's letter of May 28, 1996, which outlined the corrective action steps following completion of the CMS, U.S. EPA will now proceed to develop a Statement of Basis (SB) for public comment. You will be notified when the public comment period is opened and provided with a copy of the SB. In addition to the SB, U.S. EPA will also present to the public for review and comment, documents relative to the SB including the RFI report, the CMS report, and the risk calculations performed by U.S. EPA for inorganic constituents in soil and indoor air. The risk calculations for inorganics and indoor air were submitted to you in letters dated May 28, 1996, and November 1, 1996, respectively.

Pursuant to Sections VII.3.d and IX.1, of the above referenced

Administrative Order on Consent, revisions to the CMS report maybe required after public comments. Following the comment period, U.S. EPA will notify you in writing as to either the approval of the CMS report or the need for modifications to the report.

A copy of U.S. EPA OSWER Directive No. 9355.7-04 "Land Use in the CERCLA Remedy Selection Process" was provided to you recently. Please provide the applicable and available information pertaining to land use as prescribed by this document within thirty (30) days of receipt of this letter.

If you have any questions please call me at (312) 886-4568.

Sincerely,

William Buller, Project Coordinator
Enforcement and Compliance and Assurance Branch
Waste, Pesticides and Toxics Division
MI/WI Section

cc: J. Michael Jarvis, Franklin Power Products
Michael Sickles, IDEM
John Koehnen, A.T. Kearney

bcc: Larry Johnson, ORC

ENFORCEMENT AND COMPLIANCE ASSURANCE BRANCH

SECRETARY	SECRETARY	SECRETARY	SECRETARY	SECRETARY	SECRETARY
AUTHOR/ TYPIST	**MINN/OHIO SECTION CHIEF**	**MICHIGAN/ WISCONSIN SECTION CHIEF**	**ILLINOIS/ INDIANA SECTION CHIEF**	**ECAB BRANCH CHIEF**	**WPTD DIVISION DIRECTOR**
wB 12-11-96					

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DRE-8J

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ENVIRONMENTAL PROTECTION AGENCY
77 WEST JACKSON BOULEVARD
CHICAGO, ILLINOIS 60604-3590

i0

P 140 675 617

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WILLIAM BULLER DRE-8J

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

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NOV - 1 1996

REPLY TO THE ATTENTION OF:

DRE-8J

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Samuel Waldo
Director of Environmental Affairs
Amphenol Corporation
358 Hall Avenue
P.O. Box 5030
Wallingford, Connecticut 06492

Re: Administrative Order on Consent
(Dated November 27, 1990)
Franklin Power Products/Amphenol
IND 044 587 848

Dear Mr Waldo:

The United States Environmental Protection Agency (U.S. EPA) is in receipt of your October 15, 1996, letter which enclosed proposed revisions to the report "Report of Additional Corrective Measures Studies for Former Amphenol Facility, Franklin Indiana" dated June, 1996. The proposed revisions were submitted in rough draft form as agreed in our recent telephone conversation. U.S. EPA has determined that the CMS report as presented in the October 15, 1996, submittal is approvable with the revision to the text as noted below (item 1):

1. Section 3.7, 7th paragraph - The statement "Neither this Report not the RFI report present data that suggest any easterly or southeasterly movement of the plume from Forsythe Street" is not supported by the recent water level data. The text shall be revised to acknowledge that groundwater flow direction could be interpreted to be southeasterly as based on recent water level data.

Within fifteen days of receipt of this letter, a finalized CMS report which incorporates the revisions as noted in your October 15, 1996, submittal and the revision noted above, shall be submitted to U.S.EPA. The results of the investigation of contamination at Hurricane Creek may be submitted as a supplemental document and shall be submitted to U.S. EPA within seven (7) days of receipt of analytical results.

In addition, U.S. EPA's letter of March 12, 1996, advised you that U.S. EPA intended to perform an indoor air risk assessment for residents at Forsythe Street. The results of such risk assessment is enclosed for your review. U.S. EPA recommends that this Risk assessment be included in your revised CMS report as an Appendix.

If you have any questions please call me at (312) 886-4568.

Sincerely,

William Buller

William Buller, Project Coordinator
Enforcement and Compliance Assurance Branch
Waste, Pesticides and Toxics Division
MI/WI Section

cc: J. Michael Jarvis, Franklin Power Products
w/enclosure
Michael Sickes, IDEM w/enclosure
John Koehnen, A.T. Kearney

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Mr. Samuel Waldo
Dir. of Environmutal affairs
Amphenol Corporation
358 Hall Avenue
P.O. Box 5030
Wallingford, Conn 06492-7530

4a. Article Number
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B. Buller

HRE-85

PS Form 3800, June 1991

bcc: Larry Johnson, ORC
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ENFORCEMENT AND COMPLIANCE ASSURANCE BRANCH

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MB 11/1/96					

SEP 12 1996

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

DRE-8J

10/7 Faxed to Steve Keree

Mr. Samuel Waldo
Director of Environmental Affairs
Amphenol Corporation
358 Hall Avenue
P.O. Box 5030
Wallingford, Connecticut 06492

Re: Administrative Order on Consent
(Dated November 27, 1990)
Franklin Power Products/Amphenol
IND 044 587 848

Dear Mr. Waldo:

The United States Environmental Protection Agency (U.S.EPA) has reviewed the document "Report of Additional Corrective Measures Studies (CMS) for the Former Amphenol Facility, Franklin Indiana" (dated June, 1996) which was submitted in accordance with the above referenced Administrative Order on Consent (AOC). U.S. EPA does not approve of the above referenced document as submitted and requires Respondents to amend the document in accordance with the comments noted in Attachment I of this letter. Certain issues pertaining to Hurricane Creek and the on-site groundwater recovery system require additional data collection as discussed below.

Visual observation of geologic and hydrologic conditions were employed to evaluate potential groundwater contamination at Hurricane Creek. U.S. EPA has determined that these observations as reported do not demonstrate that groundwater at Hurricane Creek has not been impacted. Respondent shall address this matter by implementing one of the two options described below:

> Option 1 - Sampling of groundwater at Hurricane Creek during low flow conditions at the approximate locations specified in the June 1994 Workplan. Employ a modified sampling procedure to that specified in the June 1994 Workplan for collecting representative groundwater samples during low flow conditions.

> Option 2 - Installation and sampling of at least one monitoring well at Hurricane Creek screened in the uppermost water bearing zone. The monitoring well shall be installed at either creek bank and at a location that is not more than 500 feet upstream or downstream of Forsythe Street.

U.S. EPA hydrologists have reviewed the existing data pertaining to the operation of the on-site groundwater recovery system and determined that the data are insufficient to evaluate the recovery system's effectiveness. U.S. EPA concludes that to fully evaluate the recovery system, additional piezometers/monitoring wells are needed to define the potentiometric surface during operation of the system.

Within seventy five (75) days of receipt of this letter, Respondents shall submit to U.S. EPA for approval, an On-site Recovery System Evaluation Workplan which incorporates the specifics of Attachment I. Since contaminant reduction may have occurred following the last sampling event, existing monitoring wells shall be sampled/analyzed so that the proposed piezometer locations are based on a recent plume delineation.

Within thirty (30) days of receipt of this letter, Respondents shall submit a revised report for the June 1996 CMS report which addresses all the general and specific comments given in Attachment I of this letter. The revised report shall clearly state which option Respondents have chosen to evaluate contamination at Hurricane Creek, and the specifics for implementing the investigative option. All revisions to the report shall be clearly identified by highlighting all additions and striking out all deletions. The report submittal shall include a response to comments which summarizes the responses and notes where the revisions were inserted in the report. If Respondents believe that certain deviations from the directives in this letter are necessary, such changes shall be discussed with U.S. EPA and approved prior to submittal of documents.

Should Amphenol fail to satisfactorily respond to all items in Attachment I and the Hurricane Creek and recovery system data needs, U.S. EPA may exercise its right to perform work as needed to fulfill the data requirements and complete the CMS report.

If you wish to discuss any items please contact me at (312) 886-4568.

Sincerely,

William Buller, Project Coordinator
Enforcement and Compliance Assurance Branch
Waste, Pesticides and Toxics Division
MI/WI Section

cc: J. Michael Jarvis, Franklin Power Products
with enclosure
Michael Sickles, IDEM with enclosure
John Koehnen, A.T. Kearney, with enclosure

bcc: Larry Johnson, ORC with enclosure
Author Copy
Branch Copy
Section Copy

ATTACHMENT I

On Site Recovery System Evaluation Workplan

The Recovery System Evaluation Workplan shall include the following:

- Procedures to ensure that the existing recovery system will be operated to maximize the recovery and containment of contaminants.

- Results of analysis for volatile organic compounds (VOC)s. At a minimum, wells sampled and analyzed shall include MW 3, MW 22, MW 24, MW 27, MW 28, MW 30, and IT 3.

- A map showing the current and proposed piezometer/well locations. Unless the contaminant plume is diminished significantly, six or more piezometer/wells may be needed. At least two of the piezometers at perimeter locations (preferably all of them) shall be constructed so that representative groundwater samples can be collected. Following installation, all wells and piezometers shall be measured during operation of the recovery system and within a short time frame.

- A schedule of implementation for the Workplan including submittal of a Recovery System Evaluation Report. The report shall provide a map showing potentiometric head data for each measuring point, potentiometric contours and groundwater flow lines.

U.S. EPA Comments on June, 1996 CMS Report

General Comments

✓ 1. The June 1996 report describes an investigation that had already been completed, however the field procedures are discussed in the context that the work is forthcoming, rather than stating the procedures were performed in accordance with the Work plan. The text shall be revised to state that the Workplan procedures were followed and note any procedures which deviated from the plan.

2. The groundwater contour levels in sheet 1 do not correspond to the water level data of wells MW31, MW32,and MW33. These data ✓ indicate that groundwater flow direction at the time of measurement was to the southwest at this location. This flow direction is significantly different than the southeastern direction shown. The figure should be revised to show water level contours that correspond to the data.

3. The report cites that VOC contaminant concentrations at Forsythe Street are much lower than previous sample results and draws the conclusion that significant natural attenuation of contaminants has occurred. The text should note the different sampling methods (geoprobe vs monitor wells) and how data comparisons for the two methods may overstate attenuation. Also the text should discuss when monitor well samples were collected; that is, were samples collected prior to pump tests or after.

4. The conclusion that natural attenuation of VOCs is significant should be supported by data - comparison of on-site to off-site concentrations of VOCs, ratios of the VOC parent compounds (i.e. PCE, TCE) to daughter compounds (i.e., DCE, vinyl chloride).

5. The report states that utility lines may prevent installation of a pipeline at Forsythe street (Operable Area 3). All available information including location, depth, and dimensions of utility lines at Area 3 shall be provided.

6. Unless existing utility lines preclude such construction, the discussion of remedies for Operable Area 3 shall be expanded to include the construction and operation of an extraction/infiltration gallery at Forsythe Street. The remedy shall be discussed in accordance with Attachment I of the AOC and include a discussion on installation by horizontal drilling methods.

7. To provide monitoring of the Unit D aquifer, the proposed groundwater monitoring system proposed shall include a monitoring well located near MW-32 screened in Unit D.

8. A detection limit of 80 parts per billion (ppb) was reported for lead analysis for treated groundwater, whereas the action level is 15 ppb. The treated water shall be resampled and the lead content determined by an analytical method with a detection limit of 15 ppb or less.

Specific Comments

1. Page 14 - Text does not clarify that the existing recovery

system is operated so as to maximize recovery/containment of contaminants. The existing system shall be operated to maximize its effectiveness and the text shall be revised accordingly.

2. Page 20 - the word public is misspelled.

3. Page 24 - The Statement "there is no evidence that Hurricane Creek is a groundwater sink" shall be deleted.

IND 044 587 848

IND ~~004 587 848~~

D.3.2

HRE-8J

DATE: OCT 31 1995

SUBJECT: TECHNICAL SUPPORT FOR AMPHENOL FACILITY, FRANKLIN INDIANA

FROM: Paul Little, Chief
Michigan/Wisconsin Section
Enforcement and Compliance Assurance Branch

TO: Donald Draper, Director of Technical Assistance
Technical Assistance Technological Transfer Branch
Subsurface Protection and Remediation Division
National Risk Management Research Laboratory
U.S. Environmental Protection Agency
Ada, Oklahoma

This memorandum is to formally request technical support by your staff and provide some definition of the scope of work requested.

The Amphenol facility is performing corrective action under a RCRA 3008(h) Consent Order and recently submitted a second draft of a Corrective Measures Report. This report defines three "operable areas", Areas 1, 2, and 3. Area 3, which delineates a contaminated off-site area which apparently was caused by a leaky sanitary sewer, is the area for which Region V requests technical support. The technical support would be primarily to evaluate the hydrological conditions and various technologies to remediate this area. It is anticipated that the primary technical support will be needed in about 30 days, and in segments thereafter as the process develops.

Steve Acree of your staff recently provided preliminary technical support to Region V on this matter and this is greatly appreciated. Hopefully the scope of work and schedule is agreeable to you. Thank you in advance for your support, if you need further clarification please call Bill Buller of my staff at (312) 886-4568.

CONCURRENCE REQUESTED FROM REB			
SEC/BR SECRTRY			
OTHER STAFF	REB STAFF	REB SECTION CHIEF	REB BRANCH CHIEF
K.W. 10-27-95	10/27/95	PL 10-27-95	

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

DATE: 18 NOV 1986

SUBJECT: Bendix Connector Operations
Amphenol Products Division
Franklin, Indiana
IND 044 587 848

FROM: William E. Muno, Chief
RCRA Enforcement Section

Wm. E. Muno

TO: Michael Elam, Chief
Office of Regional Counsel

The purpose of this correspondence is to request representation from Regional Counsel at a meeting with representatives of the subject facility concerning corrective action. On July 25, 1986, Allied Amphenol Products, Bendix Connector Operations, submitted information to the U.S. EPA concerning their Franklin, Indiana facility. This information indicates that an action under Section 3008(h) of RCRA, as amended, is appropriate. I have designated James V. Callier of my staff, as the lead technical contact for this matter. His phone number is 353-7992.

A meeting has been scheduled for November 25, 1986, at 10:00 A.M. in the conference room next to Bill Miner's office on the 12th floor.

cc: Joseph Boyle

Report of Additional Corrective Measures Studies for the Former Amphenol Facility Franklin, Indiana

Prepared for:

Amphenol Corporation
358 Hall Avenue
Wallingford, CT 06492

Franklin Power Products
400 Forsythe Street
Franklin, IN 46131

Prepared by:

EARTH TECH
5010 Stone Mill Road
Bloomington, Indiana 47408

November, 1996

19716.09

5010 Stone Mill Road, Bloomington, Indiana 47408

November 19, 1996

Mr. Paul Little (DRE-8J)
Chief, Waste, Pesticides and Toxics Division
Enforcement and Compliance Assurance Branch
USEPA, Region 5
77 West Jackson Boulevard
Chicago, IL 60604-3590

Re: Administrative Order on Consent (AOC) dated November 27, 1990
Franklin Power Products/Amphenol Corporation
Franklin, IN
IND 044 587 848

Telephone
812.336.0972
Facsimile
812.336.3991

Dear Mr. Little:

Attached, please find four bound copies of a ***Report of Additional Corrective Measures Studies for the Former Amphenol Facility, Franklin, Indiana*** submitted on behalf of Respondents Amphenol Corporation and Franklin Power Products. The report was revised in accordance with your September 12, 1996 comment letter received by Amphenol on September 16, 1996, a telephone conversation between Amphenol Corporation USEPA representatives on October 8, 1996, and your November 1, 1996 comment letter received by Amphenol on November 6, 1996.

If you have any questions or comments, please get in touch with Mr. Sam Waldo.

Very truly yours,
EARTH TECH
James H. Keith
James H. Keith
Project Manager

cc: Sam Waldo
William Buller
Michael Jarvis
Thomas Linson
John Bonsett
Rick Littleton
Steve Acree

EARTH TECH

Formerly WW Engineering & Science

TABLE OF CONTENTS

TABLES

FIGURES

SHEETS

APPENDICES

1.0 INTRODUCTION

This document presents the results of additional work conducted for a Corrective Measures Study (CMS) for the former Amphenol facility located at 980 Hurricane Road, Franklin, Indiana. This report is submitted to U.S. EPA Region V in partial fulfillment of the requirements of a U.S. EPA Administrative Order on Consent (Consent Order), dated November 27, 1990, and directed to respondents Franklin Power Products, Inc., and Amphenol Corporation. In response to the Consent Order, an RFI was conducted by Earth Tech (formerly WW Engineering and Science). The report documenting the RFI dated June 13, 1994 was approved by U.S. EPA Region V in a letter dated July 22, 1994. A CMS Work Plan was developed to address site specific contamination identified in the approved RFI report. The work plan was approved by U.S. EPA on November 28, 1994, and a draft CMS report dated March, 1995 was submitted for Region V review, and the final CMS report was dated September, 1995. As a result of issues that were raised as part of U.S. EPA comments during review of the draft CMS report, a plan for additional CMS related work dated February 9, 1996 was submitted to U.S. EPA for review. Following a telephone conference between Respondents and U.S. EPA on February 29, 1996, U.S. EPA approved the plan for additional work in a letter dated March 12, 1996 and received by the Respondents on March 18, 1996. The approval was granted subject to certain modifications that were outlined in the letter and are discussed in Section 2.0 of this document. Another Supplemental Work Plan dated June 14, 1994 (*Sampling Creek Bed Water in Hurricane Creek RCRA Facility Investigation (RFI), Former Amphenol Facility*) was also approved by U.S. EPA, and was to be conducted as part of the CMS investigations. The intent of the June 14, 1994 Work Plan was to determine if soils and sediment underlying Hurricane Creek could act as a "sink" for contaminants during periods of low or no flow in the creek, thereby providing a continuous release of contaminants to surface waters or allowing the movement of contaminants south of Hurricane Creek. The tasks described under that work plan could not be carried out either during the CMS or this supplemental work because appropriate stream conditions were never encountered. The February 9, 1996 CMS Work Plan included activities to further delineate the relationship of the subsurface water-bearing and clay units (Units B and C, respectively) to the stream channel, and to assess the potential of the Hurricane Creek stream bed to act as a contaminant sink. A revised plan for sampling ground water along Hurricane Creek is discussed in this document, and any results of sampling and analysis under this plan will be forwarded as a letter addendum to this report.

Information included in the approved RFI report, and the Final CMS report dated September, 1995 is incorporated into this CMS Report Addendum by reference. Copies of relevant figures, tables, and sheets from the approved RFI report are contained in Appendix A of the September, 1995 CMS report.

Information on site use history and previous site investigations is summarized in Section 2.0 of the CMS report. Significant findings of the RFI are summarized in Section 3.0 of the CMS report.

2.0 ISSUES ADDRESSED AND SCOPE OF WORK

2.1 ISSUES ADDRESSED IN THIS DOCUMENT

The approved February 9, 1996 Work Plan described certain tasks to be undertaken in Operable Area 3 of the CMS report. Operable Area 3 consists of Hamilton Avenue between the former Amphenol Site and the intersection of Hamilton Avenue with Forsythe Street, and Forsythe Street and Ross Court between Hamilton Avenue and the bridge over Hurricane Creek (Figure 2.1). The Work Plan addressed the following issues:

- Levels of VOCs, metals, and total and amenable cyanide in Unit B ground water.
- Levels of VOCs, metals and total and amenable cyanide in subsurface soils.
- Aquifer characteristics of the saturated portion of Unit B.
- Physical characteristics of subsurface soils relating to possible corrective measures.
- Ground water parameters relating to possible corrective measures.
- Locations and elevations of the top and bottom of the saturated portion of Unit B along Hurricane Creek (if feasible).
- Preparation of an addendum to the September, 1995 CMS report addressing subsurface soil and water conditions in Unit B, and possible corrective measures.

Following its review of a draft copy of this report, U.S. EPA Region V set forth certain comments and requirements for additional data collection in a letter to the Respondents dated September 12, 1996. Revisions have been incorporated into this document in conformance with matters set forth in that letter, and a telephone conversation on October 8, 1996 between U.S. EPA personnel and Amphenol.

2.2 SCOPE OF WORK

Tasks and methods are discussed below. All phases of field work, including soil borings, well installation, sampling, analysis, recordkeeping, validation and data treatment were conducted in accordance with the IT Work Plan as modified by the Consent Order, and by the RFI QAPjP, except as revised to accommodate modifications outlined in the U.S. EPA letter dated March 12, 1996. These are discussed in this section where appropriate.

Task 1 Secure Necessary Permits for Off Site Work

A copy of the Work Plan was forwarded to Mr. Littleton, Superintendent of the Franklin Board of Public Works, with a request for permission to conduct drilling and well installation within the public right-of-way along Forsythe Street and Ross Court.

Task 2 Install Ground Water Monitoring Wells

Three ground water monitoring wells were installed on the east side of Forsythe Street and one well on the south side of Ross Court (MW-31 through MW-34). Well MW-31 was installed in an area of high tetrachloroethylene (PCE) levels in ground water near PGP-9 (CMS report Appendix A, Sheet 6D), and was constructed of 4-inch threaded Schedule 40 PVC pipe Two 2-inchpiezometers were installed nearby. Wells MW-32 and MW-34 will monitor subsurface conditions near the southern and northern ends, respectively, of Forsythe Street, and were constructed of 2-inch threaded Schedule 40 PVC pipe. Well MW-33 was located primarily to provide information on the flow direction and gradient of ground water in Operable Area 3. It was constructed of 2-inch threaded Schedule 40 PVC pipe. All wells were completed with flush-mounted protective covers and locking caps. Because the saturated portion of Unit B was shallower and thinner than on the former Amphenol site, screens consisted of 5-foot lengths of 0.010-inch slotted PVC rather than the 10-foot lengths used during the RFI.

Monitoring wells were developed as outlined in the IT Work Plan, and the RFI QAPjP. In accordance with Modification 5 in the U.S. EPA letter, the Forsythe Street wellswere thoroughly developed by surging as well as pumping/bailing to significantly reduce turbidity in the wells and to ensure that pump tests are representative of the hydraulic conductivity of the Unit B aquifer.

In accordance with Modification 4 in the U.S. EPA letter, the addition of water to monitoring well boreholes was avoided, with the exception of the use of small quantities for the hydration of bentonite.

All monitoring wells and piezometers were provided with flush-mounted protective covers and locking caps, rather than a stickup protective cover.

All soil boring cuttings were drummed and returned to the former Amphenol site for storage prior to proper disposal.

Task 3 Determine Subsurface Soil Conditions

Each well boring was continuously sampled by a 3-inch split spoon sampler, and sample headspace was screened by means of a photoionization detector (PID), and described by an Earth Tech geologist as outlined in the IT Work Plan and the RFI QAPjP approved May 25, 1991. Whenever possible, soil samples were selected for laboratory analysis from a depth interval approximating the depth of the sanitary sewer located along Forsythe Street (approximately 6-8 feet), and the interval just above the Unit B saturated zone (approximately 11-13 feet). Sampled intervals were revised in the field depending upon screening results. Soil samples were collected, placed in sample containers, and shipped to the analytical laboratory with all appropriate labels and chain-of-custody paperwork as outlined in the IT Work Plan and the RFI QAPjP. Additional samples were collected from the two sample intervals and submitted to a geotechnical laboratory for grain size analysis (ASTM D-422).

In accordance with Modification 1 of the U.S. EPA letter, undisturbed soil samples were collected from the top of Unit C at MW-31 and MW-34, and tested for permeability (ASTM D-5084) at a geotechnical laboratory.

In accordance with Modification 2 of the U.S. EPA letter, soil samples were collected as above for grain size analysis from a soil boring (SB-1)drilled and logged at the south end of Forsythe Street near the bridge.

In accordance with Modification 3 of the U.S. EPA letter, two aliquots from each split spoon sample were collected and placed in glass jars. One sample was used for field PID screening and the other held for possible laboratory analysis.

As recommended in the U.S. EPA letter, east-west cross sections to better define the geology of Operable Area 3 were developed, and included in this CMS Report Addendum.

Task 4 Determine Unit B Aquifer Characteristics

Following installation of the monitoring wells, each well location were surveyed, and the top of casing (TOC) and ground elevation determined. All monitoring well locations were surveyed to locate them on site maps. One round of tapedown measurements were made at the four new wells, and on monitoring wells at the former Amphenol Site (ICM pumping wells were excluded). Pump tests were conducted using a data logger and pressure transducer as for the RFI. Unit B hydraulic conductivity and transmissivity was determined from the pump test data. Permeability was calculated from grain size analyses conducted under Task 3. A Unit B contour map was generated based on the tapedown results.

In accordance with Modification 6 of the U.S. EPA letter, a profile of the sanitary sewer invert along Forsythe Street was generated, and included in this CMS Report Addendum.

Task 5 Determine Unit B Ground Water Quality

One round of ground water samples was collected from each of the four new monitoring wells as outlined in the IT Work Plan and the RFI/CMS QAPjP. To establish some continuity with the RFI site, a water sample was collected from MW-12 for VOC analysis. Analyses of water samples for VOCs, metals and cyanides was conducted as outlined in the IT Work Plan and the RFI/CMS QAPjP. Water samples were collected unfiltered for all parameters, including metals and cyanides. Hardness, pH, alkalinity, conductivity, TDS, DO, TSS, Ca, Mg, Mn and Fe were determined for use in design considerations during the evaluation of possible corrective measures involving ground water treatment. DO, pH and conductivity were measured by Earth Tech in the field by means of a Horiba Water Quality Checker U-10 (see next paragraph). A CLP-like QA/QC data package was provided by the laboratory as for the RFI analyses, and all data were validated prior to use in the CMS Report Addendum. A CLP-like QA/QC data package is not appropriate for the parameters Hardness, alkalinity, TSS, Ca, Mg, Mn and Fe, but the data reportswere reviewed by the data validator for consistency and transcription errors.

In accordance with Modification 7 of the U.S. EPA letter, ground water samples for metals analysis were carefully collected to minimize turbidity, preferably less than 5 Ntu. Turbidity was recorded at the time each sample was collected. In order to meet these requirements, the ground water sampling methods outlined in the QAPjP were revised. Ground water samples for metals and cyanides were collected by means of a peristaltic pump utilizing an appropriate length of 3/8-inch ID *Tygon* tubing with an interior *Teflon* lining. The tubing was shipped by the manufacturer precleaned and sealed in plastic. The tubing was attached to the peristaltic pump and the influent end of the tubing was lowered into the water until it was one to two feet below the top of the well screen. The pump was started and the pumping rate was adjusted to approximately 1,000 ml/minute by means of a graduated cylinder and stop watch. Effluent water was monitored geochemically for Ntu by means of a Horiba Water Quality Checker U-10, and Ntu was recorded in the bound field log by the sampler. As soon as three or more effluent samples had the same Ntu reading, the appropriate sample containers for metals and cyanides were filled. The tubing was disposed of after use and a new length of tubing was used for the next ground water sampling location. Ground water samples for VOCs were collected with a bailer as described in the RFI QAPjP. However, sampling for VOCs was conducted after sampling for metals and cyanides since there was virtually no disturbance of the water column from the introduction of the tubing, and little likelihood for cross contamination from the use of precleaned tubing. Conversely, the introduction of a bailer into the well can place particulates into suspension and increase Ntu, making it difficult to obtain good samples for inorganics. No samples for VOC analysis were collected by means of the peristaltic pump.

Task 6 Determine Relationship of the Saturated portion of Unit B With Hurricane Creek

The approved Supplemental Work Plan dated June 14, 1994 called for collecting water samples below the top of the stream bed gravel layer during zero flow conditions to evaluate the potential for a contaminant sink in the stream bottom. The samples could not be collected owing to constant stream flow since the approval of the plan. Since zero flow conditions have not occurred, Task 6 was developed based on preliminary field observations to evaluate the potential for a contaminant sink in the stream bottom.

The bed of Hurricane Creek appears to be entrenched in Unit C between the Forsythe Street Bridge and the storm sewer outfall. Field observations suggest that the saturated portion of Unit B could discharge into Hurricane Creek. The north bank of Hurricane Creek and the stream bottom were investigated visually in an effort to determine:

- At what point on Hurricane Creek upstream from the storm sewer does apparent recharge from the north bank begin.
- At what point on Hurricane Creek does the stream bottom begin entrenching into Unit C.
- At what point downstream is the base of Unit B above stream level, and is there apparent recharge from Unit B at this location.
- The stream bottom gradient between the storm sewer outfall and the bridge.

As features were located, they were flagged and the locations and elevations surveyed and related to other on- and off site features. The stream bottom elevations and gradient between the Forsythe Street Bridge and the storm sewer outfall were also determined.

Two additional tasks are addressed in this report that were added as a result of the U.S. EPA September 12 1996 comment letter, and a telephone conversation between U.S. EPA and Amphenol dated October 8, 1996:

Task 7 Collect and Analyze Ground Water/Subsurface Soils Along Hurricane Creek

This task was implemented with U.S. EPA concurrence in place of the June 1994 Work Plan for collecting interstitial water samples from the bed of Hurricane Creek. Multiple hand auger borings were attempted on October 10, 1996 on the north side of Hurricane Creek up to 100 feet downstream from the storm sewer outfall. All of the borings met refusal at a layer of large cobbles at depths between 20 inches and 34 inches. The top of the cobble layer was dry and the thickness of the layer is unknown. The size of the cobbles would also prevent penetration by Geoprobe and standard hollow stem auger drilling techniques. Driven stainless steel points will be used in an attempt to penetrate between the cobbles and collect a shallow ground water sample. If water is not present, the point will be removed and the hole backfilled. The results of this attempt will be communicated to U.S. EPA by telephone and by letter addendum.

Task 8 Provide Information on All Subsurface Utility Lines in Operable Area 3

Indiana Underground Plant Protection Service, the Indiana-American Water Company and the Franklin Sewer Department were contacted and asked to mark the locations of buried utility or service lines in Operable Area 3 (Hamilton Avenue from Glendale Drive to Forsythe Street; Forsythe Street from Hamilton Avenue to the Hurricane Creek Bridge, and Ross Court). The marked utility lines were located on a large scale aerial photograph and the data used to generate a map of subsurface utilities (Sheet 4).

3.0 RESULTS OF ADDITIONAL FIELD WORK

3.1 HYDROGEOLOGY

3.1.1 GEOLOGIC CROSS SECTIONS (Task 3)

Sheet 1 shows the locations of all soil borings, monitoring wells, piezometers and manholes at the former Amphenol facility and in Operable Area 3. Soil boring logs are shown in Appendix A. Elevations for water levels and sewer inverts are shown in Table 3.2. Elevations of the Hurricane Creek bottom and the top of Unit C are shown in Sheet 1. These data plus selected soil boring data from the RFI were used to prepare two geologic cross sections of the area (Sheet 2). Cross Section A-B extends from MW-12 on the north to the Unit C contact in the bank of Hurricane Creek on the south, and includes stratigraphic information from monitoring wells MW-31, MW-32 and MW-34. Cross Section C-D comprises PGP-7, MW-31 and MW-33 and provides an east-west cross section in the vicinity of Ross Court. A sanitary sewer invert profile along Forsythe Street is also shown on Cross Section A-B.

Unit A materials from the new soil borings are much the same as for the Former Amphenol site, consisting of 2.5 to 6.0 feet of silt or silt loam. Fine to coarse sands were present in most borings on site, and in places overlay a zone of sand and gravel. Unit B at MW-12 consists almost entirely of fine to coarse sands. At MW-34, a 3-foot thick sand zone overlies approximately 8 feet of sand and gravel, and at MW-31, the sand thins to one foot and the sand and gravel thins to a thickness of 6 feet. The overlying sand is not present at MW-32 and MW-33, and Unit B consists entirely of sand and gravel. At MW-32, Unit B thins to a thickness of about 5 feet.

The top of Unit C increases in elevation to the south. The elevation of the top of Unit C is approximately 710.5 feet MSL at MW-12. This increases to approximately 715.9 feet MSL at MW-31, then to 712.8

feet MSL at MW-32 and 715.1 feet MSL at the contact at the north bank of Hurricane Creek. The top of Unit C decreases in elevation west of Forsythe Street. The elevation at MW-33 is 713.9 feet MSL. The top of Unit C decreases from 715.9 MSL to 702.9 MSL at PGP-7.

The sanitary sewer invert is above the potentiometric surface at MW-12 and MW-34, and is at or below the potentiometric surface at MW-31. The sanitary sewer invert elevation increases from 716.02 feet MSL at MH-110 to 717.86 at MH-117, and is again above the level of the potentiometric surface at MW-32.

3.1.2 SOIL PROPERTIES (Task 3)

Two soil samples were collected from each soil boring, and submitted to the Earth Exploration Geotechnical Laboratory in Indianapolis, Indiana. Grain size analyses were performed on all samples. In addition, Shelby tube samples were to be collected of the top of Unit C and samples from MW-31 and MW-34 were to be measured for permeability by ASTM D 5084. Because Unit C was so dense, it was not possible to collect Shelby tube samples. Three-inch split spoon samples were collected instead, but all were recovered cracked except for MW-31 and SB-1F, for which permeability was determined Grain size analysis was also performed for Unit C material at MW-32. Results are provided in Table 3.1, and laboratory data sheets are provided in Appendix B. All of the samples above Unit C comprised well-graded to poorly-graded sands. The top of Unit C is classed as a sandy, lean clay. Permeability at MW-31 was 5.2×10^{-8} cm/sec, and at SB-1F was 4.0×10^{-8} cm/sec.

3.1.3 AQUIFER CHARACTERISTICS (Task 4)

Ground water flow direction was determined from water level measurements collected from all on site and offsite wells. Contours showing the configuration of the potentiometric surface elevations in Unit B on April 8-9, 1996 are provided in Sheet 1. Water elevation data are shown in Table 3.2. The April 8-9 data indicate a southerly to southeasterly flow of ground water on site in Unit B. Flow lines are skewed in the vicinity of the ICM as a result of the ICM capture area. Along Forsythe Street, ground water flow continues to be in a southerly to southeasterly direction; however, in the vicinity of MW-31 and Ross Court, the gradient flattens considerably for approximately 500 feet then becomes steeper near Hurricane Creek. The contours from this point south to Hurricane Creek are aligned parallel with the axis of Hurricane Creek, based on the assumption that Hurricane Creek is controlling the flow direction; however, owing to the north-south alignment of the monitoring wells along Forsythe Street and the presence of only a single well to the east (MW-33), the actual flow direction in this region may be southerly or slightly southwesterly. This does not affect the conclusions or recommendations of this report.

There has been an overall increase in ground water levels since 1993. April 8-9, 1996 ground water elevations in upgradient wells range from 0.87 to 1.16 feet higher than those measured on February 2, 1993. For wells in the vicinity of the ICM, April 8-9, 1996 ground water levels range from 0.45 to 0.13 feet higher than those measured on February 2, 1993. This smaller increase in elevation also appears to be a result of drawdown from the three ICM pumping wells.

Pump test data for MW-31, MW-33 and MW-34 are shown in Table 3.3. Wells MW-33 and MW-34 (both 2-inch) were pumped at approximately 2 gpm for 180 minutes using a Grunfos submersible pump. Drawdown in each well was measured by means of tapedown. MW-31 is a 4-inch well that had two piezometers installed 20 feet to either side of the pumping well. Two pumpdown tests at 2 gpm were performed on MW-34, one for 110 minutes, and one for 180 minutes. Drawdown was measured in the piezometers with pressure transducers and an electronic data logger. Data logger records and drawdown curves are presented in Appendix C. Walton's (1962, 1985) specific capacity formula was used with as assumed storage coefficient of 0.20 to calculate transmissivity values of 625 and 959 gpd/ft for MW-31, 2,484 gpd/ft for MW-33 and 4,927 gpd/ft for MW-34. Using the saturated thicknesses indicated in Table 3.3, the transmissivity values equate to hydraulic conductivities of 169 and 259 gpd/ft^2 for MW-31, 436 gpd/ft^2 for MW-33 and 648 gpd/ft^2 for MW-34.

3.2 SOIL ANALYTICAL RESULTS (Task 3)

Soil samples were collected from borings advanced during monitor well construction in Operable Area 3. Analyses were performed for VOC and inorganic parameters as indicated in the approved February 9, 1996 Work Plan. Sample results are compared with ARARs shown in Table 3.4. Soil analytical results are summarized in Table 3.5. Laboratory analytical reports are included in Appendix B.

Soil samples were collected from selected depth intervals as shown in Table 3.5. Tetrachloroethene (PCE) was present at levels below the detection limit in both samples from MW-34. TCA (1,1,1-trichloroethane) was detected at 8 ug/kg at MW-34, 17.0-17.5 feet. Trichloroethene (TCE) was present at levels near the detection limit in both samples from MW-31 (including the duplicate), and in both samples from MW-34. No VOCs were detected above ARARs in any soil sample, and no VOCs were detected in soils from MW-32 or MW-33 with the exception of acetone and methylene chloride which appear to be laboratory artifacts. Arsenic was present above its ARAR in all soil samples. Beryllium was present above its ARAR at MW-31D, 6.0-8.0 feet, and at MW-31, 14.0-15.0 feet.

3.3 GROUND WATER ANALYTICAL RESULTS (Task 5)

Ground water sample results for VOCs and inorganic parameters are shown in Table 3.6. Laboratory analytical reports are included in Appendix B. VOC results for MW-12 are included for comparison.

PCE was present above its ARAR at MW-31, and at MW-34 and its duplicate. Concentrations ranged from 10 to 15 ug/l, and were approximately two orders of magnitude lower than the PCE concentration at MW-12 (1,500 ug/l). TCE was also present above its ARAR at MW-31 and MW-34 and its duplicate. Concentrations ranged from 120 to 160 ug/l, and were about an order of magnitude lower than the TCE concentration at MW-12 (1,200 ug/l). TCA was present below its ARAR at MW-31 and MW-34. Concentrations ranged from 70 to 75 ug/l, and were about an order of magnitude lower than the TCA concentration at MW-12 (1,000 ug/l). No VOCs were detected in MW-33, and PCE, TCA and TCE were present at levels below the detection limit at MW-32. No inorganics were detected above ARARs in any water sample.

Ground water sample results for non-CLP parameters are provided in Appendix D. Laboratory data sheets are located in Appendix B.

3.4 HURRICANE CREEK SURVEY (TASK 6)

Hurricane Creek was visually inspected twice during this supplemental work from the Forsythe Street bridge upstream to a point near Needmore School. No areas could be located along either creek bank at which ground water appeared to be seeping into the creek. Above the storm sewer outfall, the stream bottom consisted of sand, gravel and cobbles. The gray clay taken to be Unit C was noted just below the bottom sand and gravel just down stream from the storm sewer outfall, but there were no Unit B-C contacts observed in the creek banks until the vicinity of the Forsythe Street Bridge. This is probably due to the fact that the channel bottom and banks had been disturbed by past channelization activities. Three contacts were flagged and surveyed, and are included in Cross Section A-B on Sheet 2.

Hurricane Creek bottom elevations are shown on Sheet 1. The elevation of the Hurricane Creek bottom was 714.83 feet MSL at the confluence of the storm sewer outfall with Hurricane Creek (Station 122); 713.27 feet MSL at Station 128, and 712.63 feet MSL at the Forsythe Street Bridge (Station 118). The three Unit B-C contacts ranged from 715.07 feet MSL to 715.12 feet MSL. The estimated gradient of Hurricane Creek between the Forsythe Street Bridge and the confluence of the storm sewer outfall is 0.22 foot/100 feet. Using this measurement and assuming that the top of Unit C is at a more or less uniform elevation along Hurricane Creek, it is estimated that the creek bottom intersects the top of Unit C about 130 feet upstream from the confluence with the storm sewer outfall, and is entrenched into Unit C from this point downstream.

The Unit C contacts identified in the stream bank were approximately at grade with the Unit C elevations identified in the MW-32 well boring (Sheet 2). The materials overlying the Unit C contacts identified consisted of slightly moist sand and gravel, but no water flow or seepage could be identified, despite the fact that there had been an overall increase in ground water elevations in the vicinity since the RFI was completed These findings, plus the very low ground water flow gradient shown in Sheet 1, indicate that Unit B is very unlikely to be acting as a conduit for contaminated ground water flow to Hurricane Creek, and that the thin layers of sand and gravel overlying Unit C have insufficient volume to act as a contaminant sink either from contributions from Unit B or from direct discharges into Hurricane Creek from the storm sewer outfall. This indication is substantiated further by the absence of detectable concentrations of site-related VOCs in sediment samples collected during RFI investigations (methylene chloride being the only VOC found above detection limits).

Additionally, it should be noted that the ICM has been effective in lowering the site potentiometric surface below the storm sewer invert except during extremely wet periods (see Section 5.6) when Hurricane Creek also has a strong flow.

3.5 SUBSURFACE UTILITY LINES

Sheet 4 shows the locations of subsurface water, natural gas, electric and sanitary sewer lines and laterals in Operable Area 3. Telephone lines are located behind the residences, and other utility lines are either pole-mounted or not present. The gas and electric lines were located through Indiana Underground Plant Protection Service, Inc. The water lines were located by the Indiana-American Water Company. The City of Franklin has no information about the locations of sanitary sewer laterals, but did indicate that all of the residences had hookups to the sewers located on Hamilton Avenue, Forsythe Street and Ross Court. The locations of the sanitary sewer laterals on Sheet 4 are arbitrary, but this will not alter any conclusions reached about the feasibility or applicability of corrective measures in Operable Area 3.

There is no as-built data on the exact depths of the buried utility lines and laterals. Water lines are designed to be buried to a depth of 48 inches; however, the actual burial depth varies from 36 to 42 inches. Buried electrical and natural gas lines are typically found at depths of 18 to 48 inches. Sheet 2 indicates that the depth to the sewer along Forsythe Street ranges from approximately 7 to 10 feet. The depth at the upgradient ends of the laterals probably ranges from 1.5 to 4 feet below grade.

Sheet 4 indicates that the water and natural gas main lines are located at the west edge of the pavement along Forsythe Street, and the north edge of the pavement along Hamilton Avenue. The water main for Ross Court runs along the south side of the street, and the natural gas main is behind the residences. There are two short segments of buried electrical lines: one at the fire station and one in front of the residence at 820 North Forsythe Street. From Ross Court north to Hamilton Avenue, a distance of approximately 850 feet, there are 31 buried service lines east of the pavement, and 24 buried service lines west of the pavement in addition to the water and natural gas mains that run the length of Forsythe Street.

There are 4 buried service lines on the south side of Hamilton Avenue between Forsythe Street and Glendale Drive, and 1 on the north side of Hamilton Avenue in addition to the water and natural gas mains. There are 16 buried service lines along the north side of Ross Court and 11 on the south side, including the water main. On Forsythe Street south of Ross Court, there are 9 buried service lines on the east side of the street and 2 on the west side in addition to the water and gas mains.

3.6 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

3.6.1 QA/QC Samples and Deviations from Plan Documents

Sampling and QA/QC methodologies for this investigation are derived from the IT Work Plan (1988), the Consent Order, the QAPjP documents (approved May, 1991), and the approved February 9, 1996 Work Plan. As a result of unforeseen conditions during site work, opportunities to improve or enhance data collection, and/or equipment limitations, a number of deviations from the above noted plans occurred.

1. Soil samples recovered from Unit C for permeability testing could not be collected by Shelby Tube, as the material was too dense. A 3-inch split spoon sample was collected at each location instead. Despite this, the Unit C material was recovered in a broken up condition from all but two borings (SB-1F and MW-31). So these had to be used for the permeability tests.

2. After the new wells and stream elevations were surveyed, it was noted that new elevations differed at points common to the RFI and this investigation. In particular, the new elevations were taken from a different bench mark than those of the RFI, and the new elevations were 0.76 feet higher than the RFI elevations. The subcontracted surveyor was contacted and asked to go through his notes to clarify the discrepancy. He reported that the error was made when the original control panels were surveyed in prior to the aerial photography. Since the RFI report has been approved, 0.76 feet was subtracted from each new elevation to make them compatible with the RFI elevations. Please note that there is internal consistency among all of the data, and that this will not affect any of the findings of the RFI, the CMS or this report. The discrepancy has been noted on all applicable figures and sheets in this report, and a note to that effect will be added to each copy of the RFI and CMS reports on file at the Johnson County Public Library.

3. Earth Tech field personnel were unable to remove the manhole cover at MH-120 (Sheet 1) to obtain an invert tapedown. Previous tapedown information collected by city employees was on file at the Franklin Sewer Department and this was used for MH-120 in Cross Section A-B (Sheet 2). All other invert tapedown measurements were taken by Earth Tech field personnel.

3.6.2 Laboratory Data Quality

Data from the soil and ground water samples were validated by Dr. Richard Rediske under contract to the Earth Tech Grand Rapids, Michigan Office. Validation reports are included in Appendix E. The following data qualifications were reported by the validator.

3.6.2.1 Inorganics in Ground Water

- All barium values are flagged as estimated (JB) unless they are >5X the concentration found in the field blank.
- All calcium values are flagged as estimated (JB) unless they are >5X the concentration found in the field blank.
- All copper values are flagged as estimated (JB) unless they are >5X the concentration found in the field blank.
- All nickel values are flagged as estimated (JB) unless they are >5X the concentration found in the field blank.
- Values for iron and aluminum are flagged as estimated (J) due to poor precision (>30% RPD) in the associated field duplicate.
- Arsenic, thallium and lead values for MW-31 are flagged as estimated (J) due to matrix interference.
- Lead and thallium values for MW-32 are flagged as estimated (J) due to matrix interference.
- Lead values for MW-33 are flagged as estimated (J) due to matrix interference.
- Thallium values for MW-34 are flagged as estimated (J) due to matrix interference.

3.6.2.2 Inorganics in Soils

- All metals are flagged as estimated (J) due to poor duplicate precision.
- Iron and manganese are flagged as estimated due to matrix interference.

3.6.2.3 Volatile Organics in Ground Water

- The results for acetone are flagged as estimated due to a field blank concentration of 68 ug/l.
- TCE and 1-1, DCE values are flagged as estimated (J) for MW-31 and MW-34 because of poor recovery and high RPD in the MS/MSD samples.
- Some samples had to be diluted because certain compounds exceeded linear range. The values from diluted samples should be used for the report.

3.6.2.4 Volatile Organics in Soils

- Acetone and methylene chloride should be flagged as estimated due to high %RSD.

- All methylene chloride values are flagged as estimated (JB) unless they are >5X the concentration found in the associated instrument blank.
- All acetone values should be flagged as estimated (JB) unless they are >5X the concentration found in the associated equipment blank
- The TCE value in MW-31 6.-8.0 feet should be flagged as estimated (J) due to matrix problems.
- The 1,1-DCE value in MW-31 6.-8.0 feet should be flagged as estimated (J) due to low %RPD.

3.7 CONTAMINANT PLUME DELINEATION

For purposes of comparison with RFI ground water data, analytical data from the new wells plus MW-12 were used to prepare isoconcentration maps of VOCs in ground water for DCA, TCA, TCE, PCE, and total VOCs in Operable Area 3. These are shown in Sheets 3A-3E. Concentrations from MW-12 are also compared with those of the last RFI sampling event, in February 16, 1993.

Sheet 3A shows DCA in ground water. There were no detections of this compound above detection limits and there is no off site plume. MW-12 had a DCA concentration of 26 ug/l, as compared with a value of 136 ug/l on February 16, 1993.

Sheet 3B shows PCE in ground water. Based upon the most recent data, the contaminant plume appears to extend nearly to the entrance to Ross Court. MW-12 had a PCE concentration of 1,500 ug/l, as compared with a value of 5,695 ug/l on February 16, 1993.

Sheet 3C shows TCA in ground water. Based upon the most recent data, the contaminant plume appears to extend to approximately the entrance of Ross Court. The ARAR for TCA was not exceeded at any off site well. MW-12 had a TCA concentration of 1,000 ug/l, as compared with a value of 2,221 ug/l on February 16, 1993.

Sheet 3D shows TCE in ground water. Based upon the most recent data, the contaminant plume appears to extend to approximately the entrance to Ross Court, not quite as far south as the plume delineated in the RFI report (Sheet 6D). MW-12 had a TCE concentration of 1,200 ug/l, as compared with a value of 4,750 ug/l on February 16, 1993.

The data indicate that a ground water contaminant plume is present beneath Forsythe Street from the former Amphenol site to the vicinity of the entrance of Ross Court. The cross sections indicate that the top of Unit C tends to increase in elevation with distance south from the Former Amphenol site. Ground water levels may decrease during dry periods to the point where Unit C slows or blocks southward flow. The top of Unit C does decrease in elevation to the west, but Geoprobe ground water samples collected west of Forsythe Street during the RFI indicated no significant ground water contamination.

Both historic ground water tapedown measurements, and measurements collected for the RFI and CMS, indicate that ground water flow on and adjacent to the former Amphenol facility is southerly. As discussed in Section 3.1.3 of this report, the ground water flow direction further south along Forsythe Street may be more southerly, or slightly southwesterly. Recent water level data suggest that ground water flow may bemore southeasterly; however, neither this report nor the RFI report present data that suggest any easterly or southeasterly movement of the plume from Forsythe Street (i.e., no VOC contamiants were detected either at PGP-12 or MW-33), and there is no evidence that contaminants occur in ground water further south than Ross Court. We conclude that the plume comprises a zone of secondary contamination surrounding the sanitary sewer that resulted from exfiltration of sewer effluent above the potentiometric surface. Where the sewer is below the potentiometric surface, infiltration from the ground water to the sewer would have occurred, effectively preventing the release of contaminants to the ground water. Analytical results indicate that VOC contaminant levels in ground water have decreased significantly at MW-12 from the last round of ground water sampling on February 16, 1993 (see tabulated data below). DCA has decreased to 19 percent of its 1993 value; PCE has decreased to 26 percent of its 1993 value; TCA has decreased to 45 percent of its 1993 value, and TCE has decreased to 25 percent of its 1993 value.

Comparison of 1994 sample results for Geoprobe sampling location PGP-16 with 1996 monitoring well sample results for MW-31 and MW-34 (see tabulated data below, and Sheet 1 for locations) suggests that VOC contaminant concentrations along Forsythe Street may have also decreased significantly. DCA was not measured above detection limits in 1994, so cannot be compared. PCE had a high value of 79 ug/l at, and was present between 11 and 15 ug/l at MW-31 and MW-34 in 1996 (14 to 18 percent of the 1994 value). TCA had a high value of 100 ug/l at PGP-16 and was present between 70 and 75 ug/l at MW-31 and MW-34 in 1996 (70 to 75 percent of the 1994 value) TCE had a high value of 400 ug/l at PGP-16 and was present between 120 and 160 ug/l at MW-31 and MW-34 (30 to 40 percent of the 1994 value). These reductions are comparable with those noted at MW-12, with the exception of TCA. However, TCA is not present in ground water above its ARAR.

Sampling Location	MW-12	MW-12	PGP-16	MW-34	MW-34 Dupe	MW-31
Date	1993	1996	1994	1996	1996	1996
Analyte (ug/l)						
DCA	136	26	12U	2J	2J	3J
PCE	5,695	1,500	12U	11	10	15
TCA	2,221	1,000	100	75	73	70
TCE	4,750	1,200	400J	120	160	130

Geoprobe samples were collected from the annulus of a driven sampling train from a portion of the Unit B saturated zone by means of a mini-bailer following the removal of three full bailers of water. The monitoring well samples were collected from wells screened in all or most of the Unit B saturated zone by means of a bailer after removing three well volumes of water, and prior to the initiation of monitoring well pump tests to determine aquifer characteristics. There appears to be nothing in the U.S. EPA technical literature that suggests that one sampling method or the other has characteristics which lead to significantly greater loss of VOCs during sampling. Chiang and others (1995) have investigated the relationship between organic solute concentrations in aquifers and concentrations obtained from monitoring wells. One conclusion reached in that study is that there can be a vertical distribution of solute concentrations within an aquifer based upon changes in aquifer characteristics with depth, and analytical results obtained from a monitoring well can vary based on the extent of the saturated thickness screened and sampled. A sample collected from a well with a large screened interval may reflect an average solute concentration for the aquifer, which might therefore differ from a sample collected from a well screened in only a portion of the aquifer. The Forsythe Street data alone are not sufficient to determine if measured decreases in VOC concentrations are real or artifacts generated by changes in sampling methodology. However, VOC decreases in ground water along Forsythe Street are comparable with those noted at MW-12, where there was no difference in sampling technique. This comparison suggests that the observed reductions in VOC concentrations in on site and off site ground water are probably significant. Monitoring of ground water along Forsythe Street should be continued to verify this situation.

With the ICM in place to prevent further off site migration of contaminants, and no other available source for contaminants on the former Amphenol site, the plume in Operable Area 3 is expected to dissipate with time.

4.0 QUALITATIVE RISK ASSESSMENT

The Qualitative RA prepared for the RFI report determined that the former Amphenol site did not pose an unacceptable risk to human health and the environment. Where the sewer is below the potentiometric surface, infiltration from the ground water to the sewer will occur, effectively preventing the release of contaminants to the ground water. Periodic monitoring of on site and off site environmental conditions was recommended. The results of the investigations discussed in this report do not alter those conclusions, and periodic ground water monitoring is recommended at the four newly installed monitoring wells.

5.0 INTERIM CORRECTIVE MEASURE

5.1 BACKGROUND

Based on the results of the RFI and with the concurrence of U.S. EPA, respondents initiated the design and implementation of an interim corrective measure (ICM) in August 1994. The purpose of the ICM is twofold. First, ground water remediation is being implemented using a pump-and-treat system. Second, the pumping is being utilized to depress the potentiometric surface in Unit B to a level below the storm sewer invert, thereby halting the release of VOC constituents to the storm sewer and ultimately to Hurricane Creek. The ICM system was installed by Wehran EMCON Northeast, Indianapolis, Indiana, and began operations the second week of February 1995. In February 1996, Respondents assigned the operation and maintenance of the ICM to Handex, an environmental remediation firm with offices in Indianapolis, Indiana. This section discusses the ICM and its performance between May 1995 and May 1996.

5.2 SYSTEM INFORMATION

The ICM consists of three four-inch recovery wells equipped with 5-foot lengths of slotted Schedule 40 PVC screens. RW-1 is located at the southeast corner of the property near RFI well MW-30 and is 18.0 feet deep. The screen interval is 11 to 16 feet. RW-2 is located near RFI wells MW-12 and MW-25 and is 21.5 feet deep. The screen interval is 14 to 19 feet. RW-3 is located near RFI wells MW-22 and MW-23, and is 23.5 feet deep. The screen interval is 16 to 21 feet.

Initially, each well was fitted with a submersible pneumatic pump with a capacity of 10 gallons per minute (gpm) for a maximum flow rate of 30 gpm. All pumps were operated from an air compressor located in an air stripper building constructed for the ICM. Pneumatic pump controls for RW-1 were located in a covered pit at the wellhead. Pneumatic pump controls for RW-2 and RW-3 were located in the air stripper building.

5.3 EMCON MONITORING AND MAINTENANCE ACTIVITIES

EMCON personnel collected ground water samples from RW-1, RW-2 and RW-3, and air stripper effluent on May 3, 1995, August 3, 1995 and November 7, 1995. A sample of air stripper effluent only was collected on December 13, 1995. All samples were analyzed for VOCs. In addition, the August 3, 1995 and December 13, 1995 air stripper effluent samples were analyzed for RCRA metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc) and cyanide.

Maintenance activities included periodic inspections to ensure the system was operating normally, removal of scale from the air stripper, and recording pumpage from influent flow meters. Water level measurements were collected from all site monitoring wells and the three recovery wells on August 29, 1995 and November 7, 1995.

5.4 HANDEX MONITORING AND MAINTENANCE ACTIVITIES

On April 12, 1996, ground water samples were collected from recovery wells RW-2 and RW-3, as well as an effluent sample from the air stripper. All samples were analyzed for VOCs. On July 8, 1996, ground water samples were collected from recovery wells RW-1, RW-2 and RW-3 and analyzed for VOCs. On September 24, 1996 a sample was collected from the stripper effluent and analyzed for lead. Results are shown in Table 5.1.

Water level measurements were collected from all site monitoring wells (except wells installed for additional CMS investigations) and the recovery wells on April 12, 1996, May 29, 1996, June 4, 1996, July 8, 1996 and August 1, 1996. Results are shown in Table 5.2.

Handex personnel inspect the ICM biweekly to ensure that it is operating normally and to record pumpage from influent flow meters. Equipment replacements, repairs and upgrades are conducted during these inspection periods and required. The pump at RW-1 frequently malfunctioned, and caused the system to shut down several times during the first year of operation. The problem was identified as a malfunctioning controller caused by moisture buildup at the RW-1 well pit. The discharge hose and pump in RW-1 was replaced by a controllerless pump and new discharge line in May, 1996 to circumvent this problem.

In the original configuration, system shutdown activated an exterior flashing red light on the north side of the stripper building. When plant workers at the Hurricane Road facility saw the red light, they were to notify the ICM operator, who would come to the site and remedy the problem. This procedure did not work as planned, resulting in several extended periods of system shutdown. To alleviate this problem, an automatic telephone dialer was installed in June 1996. The dialer will call the Handex Indianapolis office and indicate an alarm condition should low or high pressure be detected in the air stripper.

5.5 EFFLUENT MONITORING

Monthly effluent monitoring for total VOCs was initially required by the City of Franklin, but was subsequently reduced to quarterly sampling with the concurrence of the City of Franklin.

Table 5.1 summarizes analytical data for the recovery wells and air stripper effluent from May 3, 1995 through September 24, 1996, 1996. Laboratory data sheets for inorganics for August 3, 1995, December 3, 1995 and September 24, 1996 are included in Appendix F. Only VOCs for which there were positive results are shown on the table. Air stripper feed concentrations (expressed as Total VOCs) from RW-1 ranged from 853 ug/l on May 3, 1995 to 515 ug/l on July 8, 1996. Feed concentrations at RW-2 were 6,819 ug/l on May 3, 1995, dropped to 3,010 ug/l on April 12, 1996, and increased to 5438.3 ug/l on July 8, 1996. RW-3 feed concentrations were 3,628 ug/l on May 3, 1995, dropped to 1,743 ug/l on April 12, 1996, and increased to 2010.5 ug/l on July 8, 1996. All VOCs were below detection limits in the air stripper effluent. No metals were present above detection limits in the stripper effluent on August 3, 1995 and December 13, 1995, and cyanide was measured at the detection limit in stripper effluent on December 13, 1995. The lead concentration in the September 24, 1996 effluent sample was less than the 5 ug/l detection limit.

5.6 GROUND WATER LEVELS

Table 5.2 shows changes in ground water levels, as measured at all site monitoring wells on February 23, 1995, March 2, 1995, August 29, 1995, November 7, 1995, April 12, 1996, 29, 1996, June 4, 1996, July 8, 1996 and August 1, 1996. Water levels were measured in recovery wells on August 29, 1995, November 7, 1995, April 12, 1996, May 29, 1996, June 4, 1996, July 8, 1996 and August 1, 1996. Maximum drawdowns were obtained during the fall of 1995 and winter of 1996 (August 29, 1995 to April 12, 1996); however, heavy spring precipitation in 1996 increased the elevation of the potentimetric surface to levels greater than those at the time of startup. On April 12, 1996, it was determined that potentiometric surface elevations were below the storm sewer invert in the vicinity of IT-2, MW-12 and IT-3, and potentiometric surface elevations in the vicinity of MW-22 were below the storm sewer invert on November 7, 1995. Water levels measured in June, July and August show that potentiometric surface elevations have decreased throughout the summer months of 1996, but still appear to be somewhat higher than the storm sewer invert.

Figure 5.1 shows potentiometric surface contours in the vicinity of the ICM on April 12, 1996. Figure 5.2 shows potentiometric surface contours in the vicinity of the recovery wells on May 29, 1996 after a series of heavy rains. The figures indicate that the ICM is influencing ground water levels in its vicinity, but during the Spring of 1996, a distinct cone of depression is not present.

5.7 VOLUME OF GROUND WATER TREATED

Table 5.3 summarizes the cumulative pumpage from the three recovery wells. From February 24, 1995 through August 27, 1996, a total of 5,117,396 gallons of ground water has been treated by the air stripper and directed to the sanitary sewer. This is an average of 0.009 million gallons per day (6.1 gallons per minute). According to Mr. Rick Littleton of the Franklin Board of Public Works, the city wastewater treatment plant has a capacity ranging from 6.5 to 7.5 mgd. Over the past year, the ICM has increased flow to the sanitary sewer system by about 0.1 percent. If the ICM operates at a maximum flow rate of 30 gallons per minute (Section 4.2 of the CMS report), the ICM would increase the flow to the sanitary sewer by about 0.5 percent.

5.8 CONCLUSIONS AND RECOMMENDATIONS

Performance data indicate that the ICM is lowering the potentiometric surface in the vicinity of the recovery wells to elevations below the storm sewer invert, except during periods of exceptionally high ground water recharge such as have occurred during the Spring of 1996. Levels of VOCs in recovery wells are less than half their initial values, so it appears that cleanup of the ground water in Unit B is being achieved by the ICM.

It is recommended that performance monitoring of the ICM be continued. It is also recommended that samples of effluent be collected from the storm sewer outfall as part of overall corrective measure performance monitoring. An On-Site Recovery System Evaluation Work Plan is being prepared for U.S. EPA review and comment.

6.0 IDENTIFICATION AND DEVELOPMENT OF CORRECTIVE MEASURE ALTERNATIVES

6.1 CORRECTIVE MEASURE OBJECTIVES

The overall objective of the corrective measure is to protect public health and the environment from unacceptable risk associated with impacts to soil, surface water and ground water from past manufacturing practices at the former Amphenol site. The principal area considered for this CMS supplement is off site ground water impacted with PCE and TCE above ARARs along Forsythe Street. This area is identified as Operable Area 3 in the September 1995 CMS report.. A qualitative risk assessment conducted as part of the RFI determined that exposure to impacted off site ground water is limited because of the depth of the impacts, and does not present an unacceptable risk.

6.2 IDENTIFICATION OF CORRECTIVE MEASURE ALTERNATIVES

The CMS identified a number of possible corrective measure alternatives to address impacted off site ground water. Principle alternatives which were identified included no action, monitoring, soil vapor extraction with air sparging, and ground water extraction and treatment. Following is a discussion of these four remedial alternatives.

6.2.1 Alternative 1: No Action

The No Action Alternative serves as the basis on which all other alternatives can be compared. Under this remedial alternative, no active remedial action or institutional action would be taken regarding the site.

6.2.2 Alternative 2: Monitoring

One conclusion of the September 1995 CMS report was that insufficient data were available to determine the spatial extent of ground water impacts along Forsythe Street, and any change in the degree of impacts over time. In accordance with the supplemental CMS work plan approved on March 12, 1996, four additional monitoring wells and two piezometers were installed along Forsythe Street and Ross Court. Ground water sampling from these monitoring wells have better defined the extent of impacted off site ground water. Data from this supplemental work, plus data generated by ICM performance monitoring indicate that concentrations of TCA, PCE and TCE have decreased, and significant ground water impacts disappear in the vicinity of the entrance to Ross Court.

Alternative 2 recommends continued monitoring of off site impacts through semi-annual sampling of a representative set of on site monitoring wells, plus newly installed wells MW-31, MW-32, MW-33 and MW-34, and proposed MW-35, installed to sample Unit D, and located adjacent to MW-34. to document the long-term trends for TCA, PCE and TCE concentrations in ground water. Data from the supplemental CMS sampling indicate that TCA, PCE and TCE concentrations in ground water are decreasing and that the impacted portion of Operable Area 3 is not increasing and may be decreasing. Through continued monitoring of ground water quality, the trend of declining VOC concentrations will continue to be documented.

6.2.3 Alternative 3: Ground Water Extraction and Treatment

Alternative 3 includes a ground water extraction system to capture impacted ground water along Forsythe Street, and utilize unused capacity in the existing ICM air stripper to provide treatment for the ground water in Operable Area 3 prior to discharge to the municipal sewer system. Based on present ground water levels and data developed from this supplemental CMS, a *Quickflow* ground water flow model was used to determine the feasibility of a purge well system to capture impacted ground water assuming that ICM purge wells RW-1, RW-2 and RW-3 were in operation. The model determined that two additional recovery wells located at MW-34 and the entrance to Ross Court, each pumping at a rate of 5 gpm would capture ground water along Forsythe Street.

6.2.4 Alternative 4: Ground Water Sparging and Soil Vapor Extraction

This alternative includes the addition of a ground water sparging and soil vapor extraction (SVE) system along the impacted length of Forsythe Street. The system would be configured with a line of approximately 12 air sparging and 3 SVE wells installed along Forsythe Street within the city right-of-way. The sparging system would act to partition the volatile contaminants out of the ground water and into the air stream, carrying the VOCs into the unsaturated vadose soils above. The screened sections of the air sparging wells would extend six inches into Unit C. The SVE wells would be installed in the vadose soils above the sparge points to collect the soil gas along with any VOC contaminants present. The system air compressor and vacuum blower would be located in a building constructed at the Former Amphenol facility, and pressure and vacuum piping would be routed along the city the right-of-way to the sparging and vacuum extraction wells.

7.0 EVALUATION OF CORRECTIVE MEASURE ALTERNATIVES

In the following section, each of the corrective measure alternatives developed and described in Section 6.0 is evaluated based on technical, environmental, human health and institutional criteria.

Technical criteria include the performance, reliability, implementability, and safety of each alternative. Performance is based on the projected effectiveness and useful life of the corrective measure. Reliability is based on the operation and maintenance requirements and demonstrated reliability of the technologies or components which make up each alternative. Implementability considers the relative ease of installation and the estimated time required to achieve the corrective measure objectives. Safety considers any potential threats to public safety, as well as to workers during implementation.

The environmental criteria comprise projected short- and long-term beneficial and adverse effects of each alternative. There are no environmentally sensitive areas (such as wetlands or habitat for protected species) that could be impacted by the site, so none of the alternatives will affect environmentally sensitive areas.

Institutional criteria include any requirements of federal, state, and local environmental and public health standards, regulations, guidance, policies, advisories, ordinances, and good community relations.

7.1 ALTERNATIVE 1: NO ACTION

7.1.1 Technical Criteria

Under a No Action Alternative, a technical evaluation of system performance, implementability and reliability is not applicable.

7.1.2 Environmental Criteria

The No Action Alternative will not address the off site impacted ground water. However, because of the location of the contamination, the minimal risk posed by the contamination, and data indicating that contaminant concentrations are decreasing, it is possible this alternative may meet the environmental criteria.

7.1.3 Institutional Criteria

The No Action Alternative fails to meet institutional criteria primarily from community relations. No action will fail to generate necessary data to document the declining nature of the off site impacts and provide the local municipal authority and neighboring residents proper assurances that the impacts are declining.

7.2 ALTERNATIVE 2: MONITORING

7.2.1 Technical Criteria

Alternative 2, incorporating continued ground water monitoring, provides a non-technology based corrective action. Monitoring provides a reliable means to document the change in the concentration of VOCs to ground water in the saturated portion of Unit B. The ground water quality data collected from Operable Area 3 indicate that contaminant concentrations are decreasing over time. The monitoring alternative may meet the technical criteria established for this area.

A periodic monitoring program is readily implementable. Four new monitoring wells have been installed in Operable Area 3 to monitor both the fate of the impacts in the areas of highest contamination and to determine if there is any movement in the contaminant plume. A fifth monitoring well is planned to be installed adjacent to MW-34 to monitor conditions in Unit D.

Monitoring does not present a risk to public health and safety or to the technician obtaining samples from the site provided that proper health and safety procedures are followed. The installed monitoring wells are located within the utility right-of-way and are provided with flush mounted covers and locking caps.

7.2.2 Environmental Criteria

Because ground water is the impacted medium, there are no short term environmental or health risks. Available data indicates that contamination concentrations are decreasing in Operable Area 3 and the plume of impacted ground water does not appear to be migrating downgradient. Therefore, there are no adverse long term affects anticipated for this alternative.

7.2.3 Institutional Criteria

Through the use of routine and periodic monitoring, the necessary information will be developed to demonstrate to public agencies and residents that impacts to ground water are decreasing and that any environmental and health risks are being minimized.

7.3 ALTERNATIVE 3: MONITORING WITH GROUND WATER EXTRACTION AND TREATMENT

7.3.1 Technical Criteria

A technical evaluation of monitoring can be found in Section 7.2.1 and is not repeated here.

Ground water extraction and treatment by air stripping is a proven technology and is currently being used for the treatment of on site impacted ground water. Based on the modeling of a pump-and treat system employing two additional recovery wells (Section 6.2.3), the extraction system would capture the impacted ground water along Forsythe Street. The ground water extraction system is considered reliable, subject to the selection of quality and proven system components. The system would consist of converting one monitoring well to an extraction well with the installation of a well pump, the installation of a new extraction well and pump, and the installation of pump discharge piping from the wells to the existing ICM air stripper.

The capture zones discussed in Section 6.2.3 are based upon recent ground water levels that are higher than normal owing to heavy spring rains, so the actual capture zone would likely be much smaller with the system as modeled, necessitating the addition of more purge wells, different pumps, or the employment of other treatment methods. This system may not be completely compatible with the ICM in its present configuration, since the distance from the compressor in the air stripper building could prohibit the effective use of pneumatic pumps and controls, as was the case for RW-1 in the ICM. All lines and controls would have to be placed in subsurface enclosures, and the buildup of moisture and problems with controller operation in such environments have already been shown to be a problem with the ICM.

The installation of pump discharge piping and electric lines is a fourth complication with this alternative because of the large number of potential interferences with existing utilities in the Forsythe Street right-of-way (see Section 3.6 and Sheet 4). Horizontal drilling could be employed to install a conduit carrying the piping and electric lines beneath the buried utility lines (i.e., at a depth greater than 4 feet). This technique, however, may be limited to only short distances in granular material with low cohesiveness, as the borehole will tend to collapse. The presence of gravels in the drilling zone can also deflect the drilling head, making it difficult to control the direction of drilling..

7.3.2 Environmental Criteria

This alternative controls potential human exposure to impacted ground water, prevents possible further migration of any impacted ground water, and reduces the overall timeframe for remediation.

7.3.3 Institutional Criteria

This alternative uses the existing ICM air stripper, and permits for discharge of treated ground water and the discharge of air stripper off-gas have already been secured. However, notification of IDEM for approval to modify the system would still be necessary. Permission to install the system in the Forsythe Street right-of-way would have to be granted by the City of Franklin, but such a treatment system would probably be viewed favorably by the city.

7.4 ALTERNATIVE 4: MONITORING WITH AIR SPARGING AND SOIL VAPOR EXTRACTION

7.4.1 Technical Criteria

A technical evaluation of monitoring can be found in Section 7.2.1 and is not repeated here.

Ground water sparging and SVE are proven technologies and are expected to be effective for the treatment of VOC contaminants in the ground water. Any possible layout of wells for this alternative within the linear right-of way would be inefficient because of the limited zone of influence for the sparging and extraction wells, and the linear nature of Operable Area 3.

Given the installation of enough sparging and extraction wells, this alternative is expected to achieve the performance requirements. The system is expected to be reliable, subject to the performance of individual system components. Mechanical components of the vacuum and compressor systems would be located in a building on the Franklin Power Products property, however the distance from the building to the wells may lead to operational problems as did the ICM pump and controller in RW-1. The installation of pump discharge piping and control lines is another complication with this alternative because of the number of potential interferences with existing utilities in the Forsythe Street right-of-way (see Section 7.3.1).

7.4.2 Environmental Criteria

Sparging combined with SVE should control human exposure to impacted ground water. Although the air sparging will not prevent possible migration of any impacted ground water, it will reduce the levels of VOCs in the ground water.

7.4.3 Institutional Criteria

Additional permits may be required for the construction air sparging and SVE system including an electrical permit and a building permit, plus a license or easement from the City of Franklin to install portions of the system in the city right-of-way. The system could be designed as a closed loop to eliminate any air emissions and eliminate the need to obtain a permit for the air discharge.

8.0 COST ESTIMATES

Table 8.1 summarizes the estimated capital cost for implementing each remedial alternative discussed in the supplemental CMS. The details are provided in Appendix G. Annual operating costs for each alternative have also been estimated and the details are provided in Appendix H.

Unit costs for some items in the estimates were taken from the 1995 Editions of *Means Construction Costs* and the *ECHOS* Environmental Restoration Costs estimating guides. Other costs utilized were based on vendor quotes and past experience with similar remediation equipment and construction services. Cost for shipping, engineering, construction management, and contingencies were calculated as a percentage of either the total equipment costs or total installed costs, as noted in the cost estimate assumptions.

9.0 RECOMMENDATION AND JUSTIFICATION OF THE SELECTED CORRECTIVE MEASURE ALTERNATIVE

9.1 RECOMMENDED CORRECTIVE MEASURE ALTERNATIVE

The recommended corrective measure for off site impacts to ground water in Operable Area 3 is Alternative 2: continued routine monitoring of the ground water quality, specifically from the new monitoring wells MW-31, MW-32, MW-33 and MW-34, and proposed monitoring well MW-35.

9.2 JUSTIFICATION OF THE RECOMMENDED CORRECTIVE MEASURE ALTERNATIVE

The September 1995 CMS report did not evaluate corrective measure alternatives for Operable Area 3 due to a lack of information about aquifer characteristics and ground water quality. As part of this supplemental CMS, four monitoring wells were installed in Operable Area 3, the stratigraphy of the subsurface soils was classified, pump tests were conducted to define the aquifer flow characteristics, and ground water was sampled to define current ground water quality. Ground water quality data indicate that VOC concentrations in the most severely impacted zone of Operable Area 3 showed a significant decrease from those measured in April, 1994. This is not unexpected since the source of the VOCs along Forsythe Street has been eliminated. Because the impacted ground water does not represent an unacceptable risk to human health or the environment, and because contaminant concentrations have been shown to be declining, it is reasonable to continue to allow naturally occurring mechanisms to reduce the contaminant concentrations and to monitor the continued declining trend in VOC concentrations.

Both ground water extraction with treatment and air sparging with SVE are viable remedial alternatives should continued monitoring suggest the need for additional remediation. Direct negative impacts of implementing one of these systems include the additional capital and operating cost to the owner, the adverse impact on the community during the construction of the system because of lane restrictions along Forsythe Street, the adverse impact an property owners along Forsythe Street with construction activities occurring in their front yards, and disturbances during well maintenance activities. The time to reduce impacts to below ARARs could be shortened with an active remedial approach. However, the ground water does not represent an unacceptable risk and a shorter timeframe is not warranted at this time. At some time in the future should it be determined that VOC concentrations are not declining, then an active remedial action can be implemented. Because of the lower cost as well as the substantially lower impact to property owners along Forsythe Street, Alternative 3 would be the recommended supplemental remedial action should future conditions warrant it.

10.0 FINAL RECOMMENDATIONS

The original CMS report for the former Amphenol site recommended the following:

- Continued operation of the ICM.
- Install off site monitoring wells along Forsythe Street.
- Monitor off site and selected on site wells for selected VOCs in ground water semiannually.
- Monitor storm sewer outfall water for selected VOCs semiannually.

- Install focused air sparging and SVE in addition to the ICM should monitoring indicate a need.
- Employ appropriate institutional controls such as signage, notification of local utilities, use of ground water and possible deed restrictions limiting excavation in severely impacted areas.

The findings of this report are as follows:

- The ICM is capable of reducing ground water elevations to levels below the storm sewer invert except in instances of unusually high ground water recharge.
- There is no evidence for the movement of a plume of VOCs in ground water from Forsythe Street.
- Levels of VOCs in ground water both off site and on site show marked decreases in concentration from 1994 levels.
- There is no evidence that Hurricane Creek bottom sediments are acting as a "contaminant sink"
- VOC levels in soils in Operable Area 3 are below ARARs.

Based on the above findings, semiannual monitoring for selected VOCs (TCA, TCE and PCE) at newly installed off site wells (including MW-35), selected on site wells, the storm sewer outfall, and Hurricane Creek at the Forsythe Street Bridge is recommended along with continued operation of the ICM (Alternative 2 of this CMS Addendum). Appropriate institutional controls are also recommended.

Based upon the findings of Task 6, additional sampling of Hurricane Creek sediments is not indicated. Monitoring of off site soils for VOCs is not indicated as VOC levels are not above ARARs, and installation of additional air sparging and SVE systems is not indicated as VOC levels in ground water have decreased markedly since 1994. At some time in the future should it be determined that corrective measures goals are not being attained by the measures recommended in this report, then an evaluation of additional corrective measures can be undertaken.

11.0 BIBLIOGRAPHY

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Table 3.1.
Geotechnical Data for Soil Samples

Sample Number	Depth Interval (feet)	% Gravel	% Sand	% Silt	% Clay	% Moisture	Dry Density (lbs/cu.ft.)	Permeability (cm/sec)
MW-31	8.0-8.5	11.7	83.2	3.3	1.8	--	--	--
	11.5-12.0	23.4	69.2	5.6	1.8	--	--	--
	13.0-14.0 (C)	7.3	43.1	32.5	17.1	10.8	131.1	5.2 x 10-8
MW-32	6.0-8.0	22.9	59.3	14.9	2.9	--	--	--
	8.0-8.8	24.9	70.1	3.6	1.4	--	--	--
	10.0-10.5 (C)	8.1	41.9	31.9	18.1	--	--	--
MW-33	8.0-8.5	0.1	96.7	1.1	2.1	--	--	--
	8.5-9.0	7.3	89.5	1.6	2.1	--	--	--
MW-34	6.0-8.0	13.1	79.5	5.2	2.2	--	--	--
	12.5-13.0	26.9	67.7	3.7	1.7	--	--	--
SB-1F	3.0-3.5	7.5	73.8	11.9	6.8	--	--	--
	5.0-5.5 (C)	4.3	38.3	37.8	19.6	10.6	137.3	4.0 x 10-8

Table 3.2

Ground Water Elevation Data

WELL NUMBER	Elev. TOC	STATIC WATER LEVEL (feet MSL)							STRATI-GRAPHIC UNIT
		25-Mar 1992	02-Jun 1992	23-Jul 1992	07-Jan 1993	02-Feb 1993	16-Feb 1993	8-9-Apr 1996	
IT-1A	736.38	718.27	717.5	717.3	720.10	720.58	720.76	ND	D
IT-2	732.25	718.95	719.5	719.8	ND	719.95	719.78	720.1	B
IT-3	728.71	718.45	718.7	718.90	ND	718.92	716.96	ND	B
MW-3	736.44	719.47	720.40	720.7	720.7	721.09	720.88	721.5	B
MW-9	733.04	720.28	721.6	721.9	ND	722.57	722.41	723.6	B
MW-12	736.38	718.99	719.6	719.9	ND	720.03	719.89	720.2	B
MW-20	734.03	721.14	722.52	722.80	ND	723.28	723.04	724.44	B
MW-21	737.91	719.44	720.31	720.62	720.60	721.03	720.81	721.44	B
MW-22	737.64	719.25	720.08	720.32	720.31	720.61	720.43	720.88	B
MW-23	737.43	718.28	717.51	717.33	720.05	720.61	720.73	ND	D
MW-24	736.02	719.12	719.80	720.00	720.06	720.45	720.21	720.70	B
MW-25	736.21	718.14	717.35	717.16	720.08	720.48	720.62	ND	D
MW-26	736.39	720.31	721.57	721.89	722.01	722.39	722.21	723.26	B
MW-27	736.63	-	-	-	-	721.19	720.96	721.67	B
MW-28	738.04	-	-	-	-	720.93	720.71	721.33	B
MW-29	737.61	-	-	-	-	720.78	720.53	721.17	B
MW-30	734.84	-	-	-	-	719.50	719.36	719.85	B
MW-31	727.72	-	-	-	-	-	-	719.08	B
MW-32	721.44		-	-	-	-	-	716.43	B
MW-33	723.29	-	-	-	-	-	-	718.60	B
MW-34	728.49	-	-	-	-	-	-	719.92	B
SEWER INVERTS									
N Storm Sewer MH	719.72	-	-	-	-	-	-	-	NA
S Storm Sewer MH	719.16	-	-	-	-	-	-	-	NA
E Storm Sewer MH	718.01	-	-	-	-	-	-	-	NA
MH 104	728.14	-	-	-	-	-	-	-	NA
MH 100	720.43	-	-	-	-	-	-	-	NA
MH 108	717.54	-	-	-	-	-	-	-	NA
MH 113	719.47	-	-	-	-	-	-	-	NA
MH 109	716.59	-	-	-	-	-	-	-	NA
MH 110	716.02	-	-	-	-	-	-	-	NA
MH117	720.72	-	-	-	-	-	-	-	NA

Note: All tabulated elevations are 0.76 feet lower than actual elevations

Table 3.3
Aquifer Transmissivity and Hydraulic Conductivity

Well	Specific Capacity Well Data (1)			Storativity	Well Radius	Specific Capacity	Transmissivity		Aquifer Thickness (2)	Hydraulic Conductivity	
	Q *(gpm)*	Drawdown *(feet)*	Time *(min)*		*(feet)*	*(gpm/ft)*	*(gpd/ft)*	*(m^2/sec)*	*(feet)*	*(gpd/ft^2)*	*(cm/sec)*
Test 03 MW-31	2	2.37	180	0.2	0.427	0.844	625	9.0E-05	3.7	169	8.0E-03
Test 04 MW-31	2	1.53	110	0.2	0.427	1.307	959	1.4E-04	3.7	259	1.2E-02
MW-33	2	0.77	180	0.2	0.333	2.597	2,484	3.6E-04	5.7	436	2.1E-02
MW-34	2	0.42	180	0.2	0.333	4.762	4,927	7.1E-04	7.6	648	3.1E-02

1. Data was determined from field obeservations made during pump tests on monitoring wells MW-31, MW-33, and MW-34.
2. Saturated thickness of the aquifer, determined from tape down measurements, was used as the Aquifer thickness.

TABLE 3.4

GROUNDWATER AND SOIL ARARs

Former Amphenol Site
Franklin, Indiana

Chemical	Final Risk-Based PRG Concentrations for Soil (residential) (mg/kg)	Final Risk-Based PRG Concentrations for Ground Water (ug/L)	Maximum Contaminant Level (MCL) (ug/L)	Maximum Contaminant Level Goal (MCLG) (ug/L)	RCRA Subpart S Action Levels (P)	
					Soil (mg/kg)	Ground Water (ug/L)
Acetone	27400	3650	#N/A	#N/A	8000	4000
2-Butanone	164000	2500	#N/A	#N/A	50000	20000
Carbon tetrachloride	4.91	0.259	5	Zero	5	MCL
Chloroform	105	0.275	80(T)	Zero	100	MCL
1,1-Dichloroethane	27400	768	#N/A	#N/A	8000	4000
1,1-Dichloroethylene	1.06	0.0167	7	7	10	MCL
1,2-Dichloroethene	2460	329	70(cis)	70(cis)	700	MCL
Methylene Chloride	85.2	6.31	5	Zero	90	MCL
4-Methyl-2-pentanone	21900	183	#N/A	#N/A	6000	3000
Tetrachloroethene	12.3	1.43	5	Zero	10	MCL
Toluene	1.6	0.213	1000	1000	2	MCL
1,1,1-Trichloroethane	24600	1550	200	200	7000	MCL
Trichloroethene	58.1	2.54	5	Zero	60	MCL
Xylene, total	548000	73000	10000	10000	200000	MCL
Aluminum	#N/A	#N/A	50(S)	#N/A	#N/A	#N/A
Antimony	110	14.6	6	6	30	MCL
Arsenic	0.355	0.0473	50(U)	#N/A	0.4	MCL
Barium	19200	2560	2000	2000	5000	MCL
Beryllium	0.149	0.0198	4	4	0.2	MCL
Cadmium	137	18.3	5	5	40	MCL
Calcium	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Chromium, VI	1370	183	100(total)	100(total)	400	MCL
Cobalt	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Copper	10200	1350	1300(A)	1300	3000	MCL
Cyanide	5480	730	200(P)	200(P)	2000	700
Iron	#N/A	#N/A	300(S)	#N/A	#N/A	#N/A
Lead	#N/A	#N/A	15(A)	Zero	#N/A	MCL
Magnesium	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Manganese	1370	183	50(S)	#N/A	10000	700
Mercury	82.1	11	2	2	20	MCL
Nickel	5480	730	100	100	2000	MCL
Potassium	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Selenium	1370	183	50	50	400	MCL
Silver	1370	183	100(S)	#N/A	400	200
Sodium	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Thallium	21.9	2.92	2	0.5	6	MCL
Tin	164000	21900	#N/A	#N/A	50000	20000
Vanadium	1920	256	#N/A	#N/A	500	200
Zinc	82100	11000	5000(S)	#N/A	20000	10000

#N/A = Not available

ARAR = Applicable or Relevant and Appropriate Requirements.
PRG = Preliminary Remediation Goal (health-based).
(T) = this value for total trihalomethanes.
(P)=Proposed
(S)=Secondary standard
(A)=Action Level
(U) = Under review.

MCLs and MCLGs are from "Drinking Water Regulations and Health Advisories", U.S. EPA, May 1994.
Action Levels were calculated according to the recommended assumptions given in the propsed Subpart S rules.

Table 3.5
Soil Analytical Data.

Sample Number	**MW-31**	**MW-31D**	**MW-31**	**MW-32**	**MW-32**	**MW-33**	**MW-33**	**MW-34**	**MW-34**
Depth Interval	6.0-8.0	6.0-8.0	14.0-15.0	6.0-8.0	8.8-9.3	6.0-7.0	9.0-9.5	6.0-8.0	17.0-17.5
Inorganics (mg/kg)									
Aluminum	1700J	757J	3530J	1200	4260J	1610J	2410J	1600J	4050J
Antimony	2.7BJ	4.1BJ	1.8UJ	3.3UJ	1.8UJ	1.9UJ	2.8BJ	2.3BJ	1.8UJ
Arsenic	3	3	5	1	5	0.52BJ	1	2	3
Barium	15.1J	7.7J	46J	5.3J	32.9J	7.2J	21.6J	11.4J	46.5J
Beryllium	0.12B	0.8B	0	0.05B	0	0.08B	0.14B	0.11B	0
Cadmium	0.28BJ	0.39BJ	0.19UJ	0.22BJ	0.19UJ	0.20UJ	0.25BJ	0.27BJ	0.31BJ
Calcium	156000	187000	119000	169000	93300	63700	135000	174000	85000
Chromium	4.6J	2.5J	6.4J	3.2J	6.5J	3.5J	5J	4.1J	7.3J
Cobalt	2.7J	1.4BJ	5J	1.5BJ	4.8J	1.8BJ	3.7J	3J	5J
Copper	15.6J	5.3J	14.7J	5.4J	12.7J	7.5J	8J	9.9J	13.5J
Cyanide (amenable)	0.50UJ	0.74J	0.96J	1.1J	0.8J	0.50UJ	0.91J	1.2J	0.61J
Cyanide (total)	0.33BJ	0.82J	0.89J	1.3J	0.89J	0.21BJ	1.5J	0.64J	1.3J
Iron	10200J	3200J	10500J	3850J	11900J	3810J	7790J	9910J	10900J
Lead	4	5	7	3	5	3	5	4	5
Magnesium	39200J	89000J	29500J	65000J	31600J	20800J	54800J	33200J	28700J
Manganese	637J	287J	260J	149J	181J	119J	191J	307J	264J
Mercury	0.04U	0.04U	0.04U	0.04U	0.04U	0.04U	0.04U	0.04U	0.04U
Nickel	10.3J	6.4J	13.8J	2.9BJ	18.5J	4.9J	5.7J	10.7J	13.3J
Potassium	322B	210U	729	222U	854	263B	487B	240B	837
Selenium	0.29UJ	0.29UJ	0.31UJ	0.31U	0.31UJ	0.32UJ	0.31U	0.29UJ	0.31U
Silver	0.30U	0.30U	0.32U	0.32U	0.32U	0.34U	0.32U	0.30U	0.32U
Sodium	167B	168B	116B	165B	117B	90.8B	137B	176B	117B
Thallium	0.23BUJ	0.23UJ	0.30BUJ	0.24UJ	0.25UJ	0.25UJ	0.24UJ	0.23UJ	0.24UJ
Vanadium	8.1J	5.4J	9.4J	5.7J	10.9J	4.7J	8J	6.8J	10.5J
Zinc	36.2J	8.7J	34J	12.8J	31.7J	18.5J	17J	34.6J	33.5J
Volatile Organics (ug/kg)									
Acetone	20JB	9JB	20JB	6JB	20JB	12JB	27JB	6JB	37JB
2-Butanone	3J	11U	3J	11U	11U	11U	11U	10U	5J
Carbon Tetrachloride	5U	5U	5U	6U	5U	5U	5U	5U	5U
1,1-Dichloroethane	5UJ	5UJ	5U	6U	5U	5U	5U	5U	5U
1,1-Dichloroethylene	5U	5U	5U	6U	5U	5U	5U	5U	5U
1,2-Dichloroethene (total)	5U	5U	5U	6U	5U	5U	5U	5U	5U
1,2-Dichloropropane	5U	5U	5U	6U	5U	5U	5U	5U	5U
Ethylbenzene	5U	5U	5U	6U	5U	5U	5U	5U	5U
Methylene Chloride	8JB	9JB	21JB	7JB	10JB	8JB	12JB	7JB	15JB
Tetrachloroethene	5U	5U	5U	6U	5U	5U	5U	2J	3J
Toluene	5U	5U	5U	6U	5U	5U	5U	5U	5U
1,1,1-Trichloroethane	5U	5U	5U	6U	5U	5U	5U	5U	8
Trichloroethene	4J	5J	3J	6U	5U	5U	5U	8	37
Xylenes	5U	5U	5U	6U	5U	5U	5U	5U	5U

Table 3.6
Ground Water Analytical Data.

Sample Number	MW-31	MW-32	MW-33	MW-34	MW-34D	MW-12
Inorganics (ug/l)						
Aluminum	219J	173J	297J	122J	198J	NA
Antimony	2.1U	2.1U	2.1U	2.1U	2.1U	NA
Arsenic	1.6UJ	1.6UJ	1.6U	1.6U	1.6U	NA
Barium	52.4	44.3	86.7	58.8	58.2	NA
Beryllium	0.30U	0.30U	0.30U	0.30U	0.30U	NA
Cadmium	0.50U	0.50U	0.50U	0.50U	0.50U	NA
Calcium	103000	85100	100000	90200	89000	NA
Chromium	0.80U	0.80U	0.80U	0.80U	0.80U	NA
Cobalt	0.90U	0.90U	0.90U	0.90U	0.90U	NA
Copper	0.60U	0.61JB	1.1JB	0.60U	0.79JB	NA
Cyanide (amenable)	10.0U	10.0U	10.0U	10.0U	10.0U	NA
Cyanide (total)	2.0U	2.0U	2.0U	2.0U	2.0U	NA
Iron	391J	343J	514J	329J	536J	NA
Lead	1.3U	1.3UJ	1.3UJ	1.8B	1.3U	NA
Magnesium	29500	25700	31600	25000	24700	NA
Manganese	30.6	11.8	108	109	117	NA
Mercury	0.10U	0.10U	0.10U	0.10U	0.10U	NA
Nickel	0.89JB	0.80U	1.9JB	1.0JB	1.4JB	NA
Potassium	2010B	730B	1230B	1790B	1740B	NA
Selenium	2.3B	3.2B	2.0U	3.8B	3.2B	NA
Silver	1.2U	1.2U	1.2U	1.2U	1.2U	NA
Sodium	23500	11900	8910	11500	10900	NA
Thallium	0.90UJ	0.90UJ	0.90U	0.90UJ	0.90UJ	NA
Vanadium	0.65U	0.52B	0.78B	0.50B	0.67B	NA
Zinc	5.3U	5.3U	5.5B	5.3U	5.3U	NA
Volatile Organics (ug/l)						
Acetone	10U	10U	10U	10U	10U	10U
2-Butanone	10U	10U	10U	10U	10U	10U
Carbon Tetrachloride	5U	5U	5U	5U	5U	5U
1,1-Dichloroethane	3J	5U	5U	2J	2J	26JD
1,1-Dichloroethylene	5U	5U	5U	5UJ	5UJ	5U
1,2-Dichloroethene (total)	5U	5U	5U	5U	5U	2J
1,2-Dichloropropane	5U	5U	5U	5U	5U	5U
Ethylbenzene	5U	5U	5U	5U	5U	5U
Methylene Chloride	5U	5U	5U	5U	5U	5U
Tetrachloroethene	15	1J	5U	11	10	1500D
Toluene	5U	5U	5U	5U	5U	5U
1,1,1-Trichloroethane	70	2J	5U	75	73	1000D
Trichloroethene	130DJ	2J	5U	120DJ	160DJ	1200D
Xylenes	5U	5U	5U	5U	5U	5U

Table 5.1
Analytical Results for ICM Influent and Effluent Samples

Location	RW-1					RW-2					RW-3					Stripper Effluent				
Date Parameter	5/3/95	8/3/95	11/7/95	4/12/96	7/8/96	5/3/95	8/3/95	11/7/95	4/12/96	7/8/96	5/3/95	8/3/95	11/7/95	4/12/96	7/8/96	5/3/95	8/3/95	12/13/95	4/12/96	9/24/96
VOCs (ug/l)																				
1,1-DCA	33	31	30	NS(1)	14	47	48	58	ND	31	28	53	48	ND	39	ND	ND	NA	ND	NA
1,1-DCE	ND(2)	ND	ND	NS	ND	8.1	ND	9.1	ND	7.3	ND	ND	6.9	ND	6.5	ND	ND	NA	ND	NA
cis-1,2-DCE	ND	ND	ND	NS	ND	3.9	ND	5.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA
PCE	100	170	ND	NS	31	1500	1500	2100	980	2100	160	16	1400	93	45	ND	ND	NA	ND	NA
1,1,1-TCA	200	180	190	NS	120	960	1100	1300	530	1200	540	560	950	450	820	ND	ND	NA	ND	NA
TCE	520	400	390	NS	350	4300	3000	2200	1500	2100	2900	870	1700	1200	1100	ND	ND	NA	ND	NA
Total VOCs	853	781	610	NS	515	6819	5648	5672.4	3010	5438.3	3628	1499	4104.9	1743	2010.5	-	-	-	-	-
Inorganics (ug/l)																				
Arsenic	NA(3)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<200	<5	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<5	<5	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<10	<10	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<20	<20	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<80	<80	NA	<5
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.5	<5	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<10	<10	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<20	<20	NA	NA
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<5	5	NA	NA

Notes: (1) NS - not sampled; well not in opersation during sampling event
(2) ND - not detected at instrument or method detection limit
(3) NA - not analyzed

Table 5.2
Ground Water Level Measurements

Well Number	Date	TOC Elevation (feet)	Depth to Water (feet)	Ground Water Elevation (feet)	Change from Previous (feet)
IT-2	2/23/95	732.25	13.25	719.00	-
	3/2/95		13.15	719.10	+ 0.10
	8/29/95		12.36	719.89	+ 0.79
	11/7/95		13.07	719.18	- 0.71
	4/12/96		13.45	718.8*	- 0.38
	5/29/96		10.82	721.43	+ 2.63
	6/4/96		11.08	721.17	-0.26
	7/8/96		11.84	720.41	-0.76
	8/1/96		12.04	720.21	-0.20
IT-3	2/23/95	728.71	11.20	717.51	-
	3/2/95		11.18	717.53	+ 0.02
	8/29/95		9.52	719.19	+ 1.68
	11/7/95		11.14	717.57*	- 1.62
	4/12/96		12.09	716.62*	- 0.95
	5/29/96		9.41	719.30	+ 2.68
	6/4/96		10.11	718.60	-0.70
	7/8/96		10.44	718.27	-0.33
	8/1/96		10.63	718.08	-0.19
MW-3	2/23/95	736.44	16.55	719.89	-
	3/2/95		16.49	719.95	+ 0.06
	8/29/95		15.23	721.21	+ 1.26
	11/7/95		16.40	720.04	- 1.17
	4/12/96		14.91	721.53	+ 1.49
	5/29/96		13.16	723.28	+ 1.75
	6/4/96		13.15	723.29	+0.01
	7/8/96		14.03	722.41	-0.88
	8/1/96		14.53	721.91	-0.50
MW-9	2/23/95	733.04	11.82	721.22	-
	3/2/95		11.80	721.24	+ 0.02
	8/29/95		9.70	723.34	+ 2.10
	11/7/95		11.47	721.57	- 1.77
	4/12/96		9.46	723.58	+ 2.01
	5/29/96		3.94	729.10	+ 5.52
	6/4/96		5.81	727.73	-1.37
	7/8/96		6.90	726.14	-1.59
	8/1/96		7.65	725.39	-0.75
MW-12	2/23/95	726.38	17.28	719.10	-
	3/2/95		17.27	719.11	+ 0.01
	8/29/95		16.43	719.95	+ 0.84
	11/7/95		17.18	719.2*	- 0.75
	4/12/96		16.21	720.17	+ 0.97
	5/29/96		15.07	721.31	+ 1.14
	6/4/96		15.31	721.07	-0.24
	7/8/96		15.88	720.50	-0.57
	8/1/96		16.16	720.22	-0.28
MW-20	2/23/95	734.03	not measured	not measured	-
	3/2/95		not measured	not measured	-
	8/29/95		10.35	723.68	-
	11/7/95		12.16	721.87	- 1.81
	4/12/96		9.70	724.33	+ 2.46
	5/29/96		6.30	727.73	+ 3.40
	6/4/96		7.63	726.40	-1.33
	7/8/96		8.58	725.45	-0.95
	8/1/96		8.93	725.10	-0.35
MW-21	2/23/95	737.91	18.03	719.88	-
	3/2/95		18.02	719.89	+ 0.01
	8/29/95		16.81	721.10	+ 1.21
	11/7/95		17.92	719.99	- 1.11
	4/12/96		16.48	721.43	+ 1.44
	5/29/96		14.82	723.09	+ 1.66
	6/4/96		14.82	723.09	0.00
	7/8/96		15.67	722.24	-0.85
	8/1/96		16.16	721.75	-0.49

Table 5.2
(cont.)

Well Number	Date	TOC Elevation (feet)	Depth to Water (feet)	Ground Water Elevation (feet)	Change from Previous (feet)
MW-22	2/23/95	737.64	18.03	719.61	-
	3/2/95		18.12	719.52	- 0.09
	8/29/95		17.05	720.59	+ 1.07
	11/7/95		17.90	719.74*	- 0.85
	4/12/96		16.74	720.90	+ 1.16
	5/29/96		15.52	722.12	+ 1.22
	6/4/96		15.63	722.01	-0.11
	7/8/96		16.22	721.42	-0.41
	8/1/96		16.58	721.06	-0.36
MW-24	2/23/95	736.02	16.85	719.17	-
	3/2/95		16.55	719.47	+ 0.30
	8/29/95		15.59	720.43	- 0.04
	11/7/95		16.41	719.61	- 0.82
	4/12/96		15.29	720.73	+ 1.12
	5/29/96		13.77	722.25	+ 1.52
	6/4/96		13.80	722.22	-0.03
	7/8/96		14.54	721.48	-0.74
	8/1/96		15.01	721.01	-0.47
MW-26	2/23/95	736.39	15.81	720.58	-
	3/2/95		15.19	721.20	- 0.38
	8/29/95		13.46	722.93	+ 1.73
	11/7/95		15.02	721.37	- 1.56
	4/12/96		13.17	723.22	+ 1.85
	5/29/96		9.53	726.86	+ 3.64
	6/4/96		10.47	725.92	-0.94
	7/8/96		11.62	724.77	-1.15
	8/1/96		12.16	724.23	-0.54
MW-27	2/23/95	736.63	16.54	720.09	-
	3/2/95		16.60	720.03	- 0.06
	8/29/95		15.37	721.26	+ 1.23
	11/7/95		16.66	719.97	- 1.29
	4/12/96		15.01	721.62	+ 1.65
	5/29/96		13.23	723.40	+ 1.78
	6/4/96		13.44	723.19	-0.21
	7/8/96		14.38	722.25	-0.94
	8/1/96		14.79	721.84	-0.41
MW-28	2/23/95	738.04	18.18	719.86	-
	3/2/95		18.21	719.83	- 0.06
	8/29/95		17.03	721.01	+ 1.18
	11/7/95		18.19	719.85	- 1.16
	4/12/96		16.72	721.32	+ 1.47
	5/29/96		15.21	722.83	+ 1.51
	6/4/96		15.32	722.72	-0.11
	7/8/96		16.12	721.92	-0.80
	8/1/96		16.54	721.50	-0.42
MW-29	2/23/95	737.61	17.92	719.69	-
	3/2/95		17.92	719.60	0.00
	8/29/95		16.83	720.78	+ 1.18
	11/7/95		17.99	719.62	- 1.16
	4/12/96		16.46	721.15	+ 1.53
	5/29/96		15.01	722.60	+ 1.45
	6/4/96		15.19	722.42	-0.18
	7/8/96		16.04	721.57	-0.85
	8/1/96		16.40	721.21	-0.36
MW-30	2/23/95	734.84	15.70	719.14	-
	3/2/95		15.72	719.12	- 0.02
	8/29/95		15.54	719.30	+ 0.18
	11/7/95		15.93	718.91	- 0.39
	4/12/96		14.95	719.89	+ 0.98
	5/29/96		14.10	720.74	+ 0.85
	6/4/96		14.38	720.46	-0.28
	7/8/96		14.84	720.00	-0.46
	8/1/96		15.06	719.78	-0.22

Table 5.2
(cont.)

RW-1	8/29/95	730.97	2.58	728.39	-
	11/7/95		not recorded	-	-
	4/12/96		11.02	719.95	- 8.44
	5/29/96		10.84	720.13	+ 0.18
	6/4/96		11.12	719.85	-0.28
	7/8/96		11.28	719.69	-0.16
	8/1/96		not recorded	NA	-
RW-2	8/29/95	732.05	4.42	727.63	-
	11/7/95		nor recorded	-	-
	4/12/96		12.72	719.33	- 8.3
	5/29/96		11.50	720.55	+ 1.22
	6/4/96		11.88	720.17	-0.38
	7/8/96		12.48	719.57	-0.60
	8/1/96		12.76	719.29	-0.28
RW-3	8/29/95	733.19	4.08	729.11	-
	11/7/95		not recorded	-	-
	4/12/96		13.07	720.12	- 8.99
	5/29/96		11.73	721.46	+ 1.34
	6/4/96		12.68	720.51	-0.95
	7/8/96		13.26	719.93	-0.58
	8/1/96		13.10	720.09	+0.16

Note: All tabulated elevations are 0.76 feet lower than actual elevations

* - Indicates that this ground water elevation is likely lower than the storm sewer invert

Table 5.3
Cumulative ICM Pumpage in Gallons

	Recovery Well Pumpage			Total
Date	RW-1	RW-2	RW-3	
2/24/95	-	-	-	-
3/3/95	20,984	31,644	80,228	132,856
3/29/95	84,695	88,774	152,228	325,697
4/14/95	136,654	133,675	224,228	494,557
5/3/95	200,683	193,729	284,420	678,832
5/14/95	237,115	228,577	319,268	784,960
5/18/95	255,043	245,727	354,116	854,886
5/23/95	255,043	245,727	354,116	854,886
5/26/95	276,211	266,031	374,420	916,662
6/19/95	445,555	428,463	536,852	1,410,870
8/3/95	445,555	428,463	536,852	1,410,870
8/4/95	448,963	431,997	543,600	1,424,560
8/9/95	473,414	453,496	590,792	1,517,702
8/11/95	482,414	461,556	609,202	1,553,172
8/14/95	496,474	474,106	637,152	1,607,732
8/29/95	561,302	533,550	768,644	1,863,496
10/6/95	664,814	629,975	985,749	2,820,538
11/7/95	665,305	763,804	1,159,950	2,589,059
12/8/95	686,316	766,356	1,253,348	2,706,020
1/15/96	778,585	873,570	1,263,941	2,916,096
4/12/96	778,585	1,170,564	1,651,617	3,600,766
5/29/96	873,365	1,376,384	1,823,668	4,073,417
6/26/96	915,555	1,414,873	1,884,622	4,215,050
7/8/96	972,328	1,474,048	1,987,350	4,433,726
7/18/96	1,006,046	1,516,919	2,060,742	4,583,707
8/1/96	1,049,996	1,577,801	2,164,916	4,792,713
8/16/96	1,091,112	1,638,683	2,246,037	4,975,832
8/27/96	1,118,169	1,684,621	2,314,606	5,117,396

Table 5.3
Cumulative ICM Pumpage in Gallons

	Recovery Well Pumpage			Total
Date	RW-1	RW-2	RW-3	
2/24/95	-	-	-	-
3/3/95	20,984	31,644	80,228	132,856
3/29/95	84,695	88,774	152,228	325,697
4/14/95	136,654	133,675	224,228	494,557
5/3/95	200,683	193,729	284,420	678,832
5/14/95	237,115	228,577	319,268	784,960
5/18/95	255,043	245,727	354,116	854,886
5/23/95	255,043	245,727	354,116	854,886
5/26/95	276,211	266,031	374,420	916,662
6/19/95	445,555	428,463	536,852	1,410,870
8/3/95	445,555	428,463	536,852	1,410,870
8/4/95	448,963	431,997	543,600	1,424,560
8/9/95	473,414	453,496	590,792	1,517,702
8/11/95	482,414	461,556	609,202	1,553,172
8/14/95	496,474	474,106	637,152	1,607,732
8/29/95	561,302	533,550	768,644	1,863,496
10/6/95	664,814	629,975	985,749	2,820,538
11/7/95	665,305	763,804	1,159,950	2,589,059
12/8/95	686,316	766,356	1,253,348	2,706,020
1/15/96	778,585	873,570	1,263,941	2,916,096
4/12/96	778,585	1,170,564	1,651,617	3,600,766
5/29/96	873,365	1,376,384	1,823,668	4,073,417

TABLE 8.1

Capital and Annual Operating Cost Summary for Corrective Measure Alternatives

Alternative Number	Corrective Measure Technology	Capital Cost ($)	Annual Operating Cost ($)
1	No Action	NA	NA
2	Monitoring	0	6,600
3	Monitoring; Groundwater Extraction and Treatment	62,000	32,000
4	Monitoring; Air Sparging with SVE	136,000	46,000

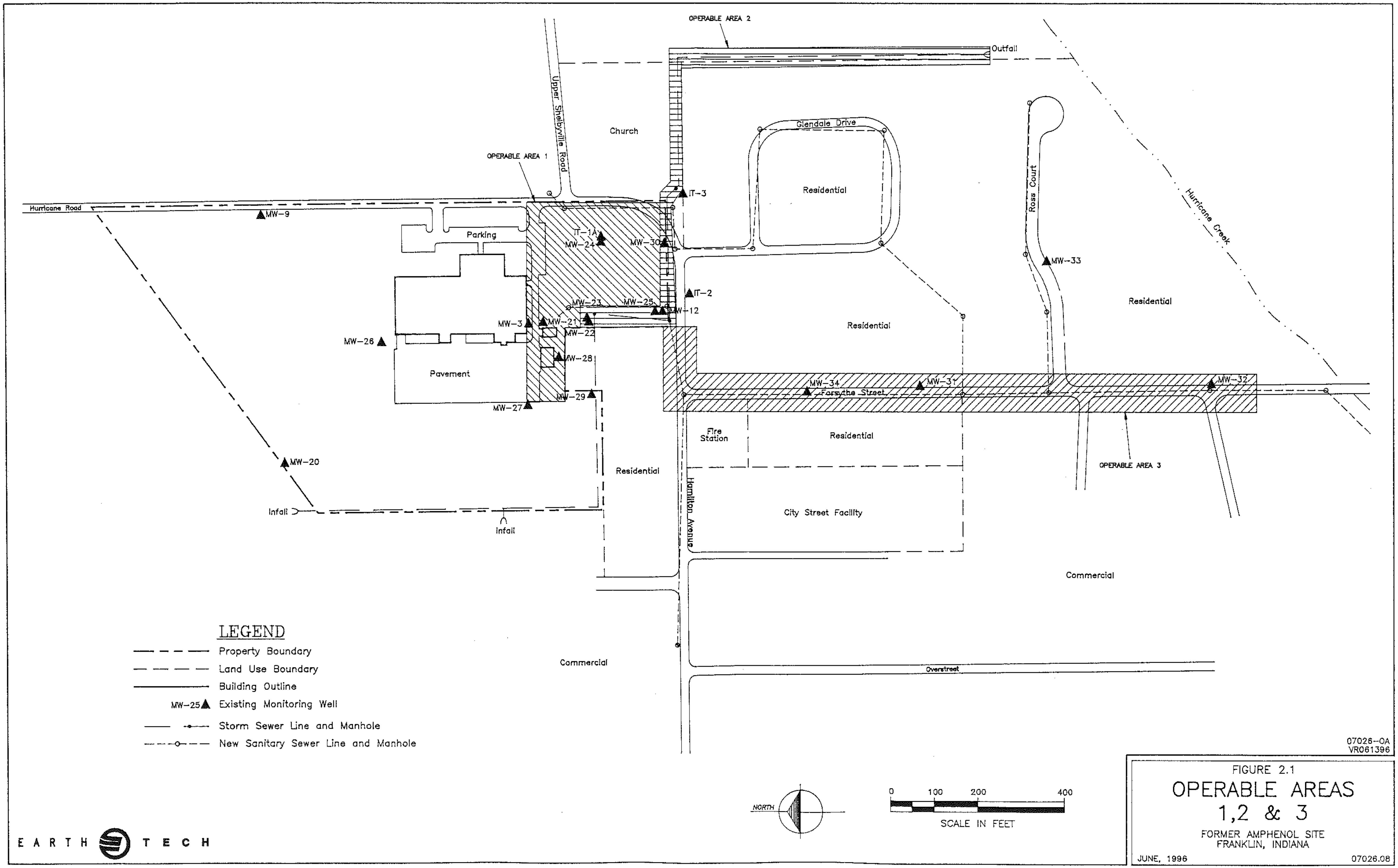


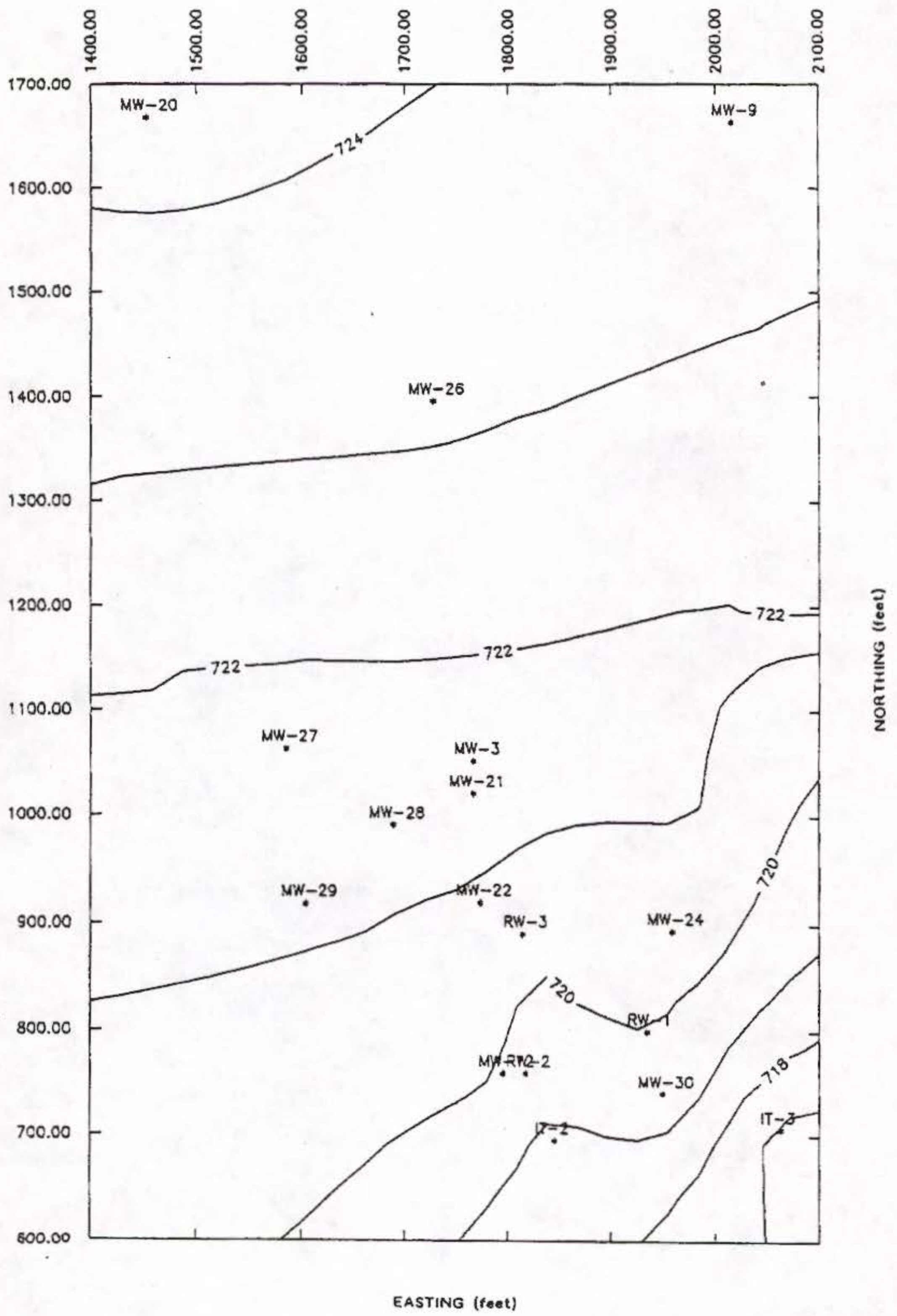
FIGURE 2.1

OPERABLE AREAS
1,2 & 3

FORMER AMPHENOL SITE
FRANKLIN, INDIANA

JUNE, 1996

07026.08



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NW061496

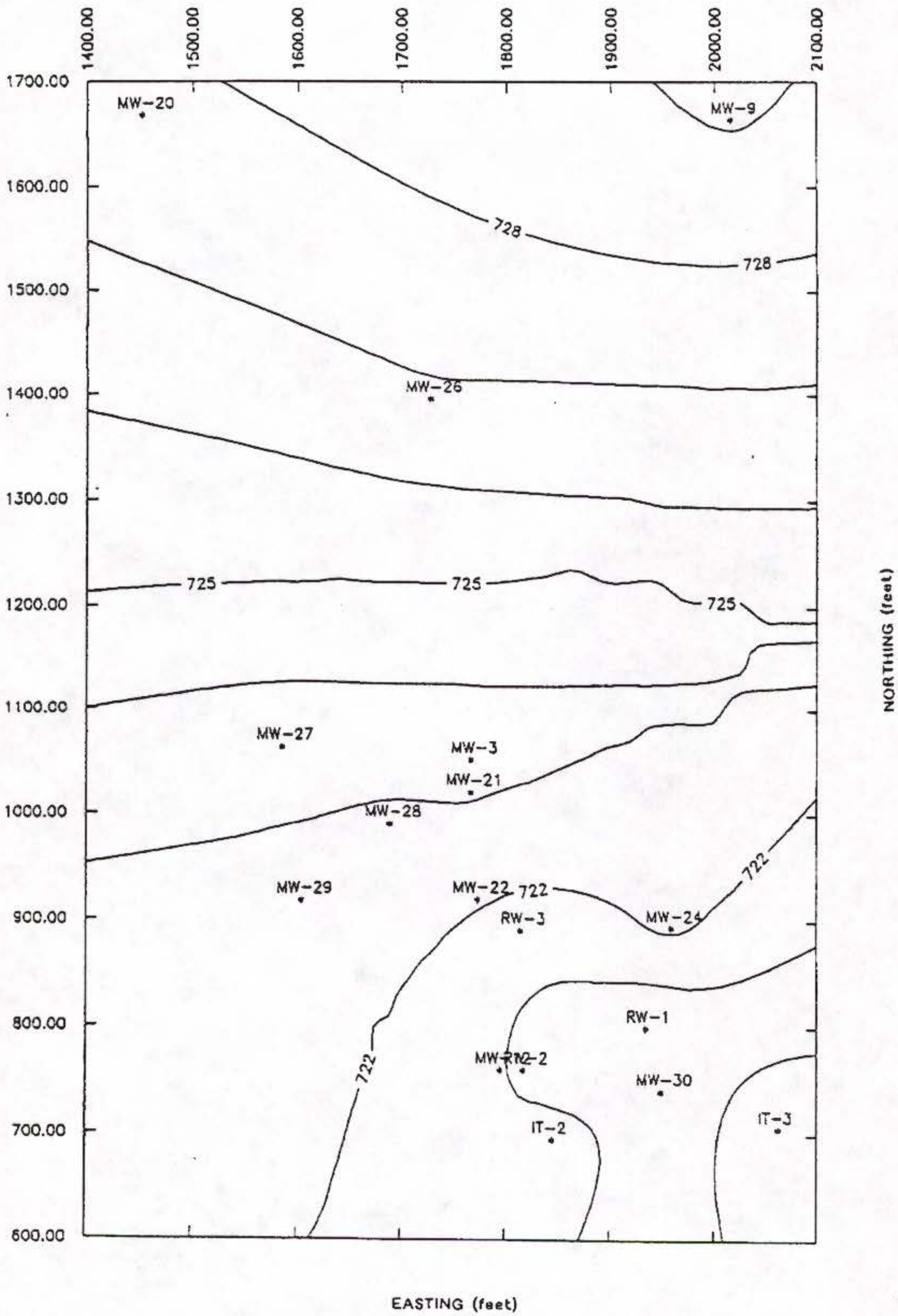
FIGURE 5.1

POTENTIOMETRIC SURFACE CONTOURS
IN THE VICINITY OF THE ICM,
APRIL 12, 1996
(CONTOUR MAP PREPARED BY HANDEX)

JUNE, 1996

07026.08

EARTH TECH



1:1
70260852
NW061496

FIGURE 5.2

POTENTIOMETRIC SURFACE CONTOURS
IN THE VICINITY OF THE ICM,
MAY 29, 1996
(CONTOUR MAP PREPARED BY HANDEX)

JUNE, 1996

07026.08

EARTH TECH

EARTH TECH

5010 Stone Mill Road, Bloomington, IN 47408, Phone (812) 336-0972, Fax (812) 336-3991

Site	Curtis - Franklin	**Boring No.**	SB-1F
Date	04-04-96	**Driller**	A. Schrader
Logged by	M. Lytle	**Elevation**	
Location		**Page**	1 of 1

					Start		Finish	
Water Level	7.60							
Time	1145				**Time**	1045	**Time**	1130
Date	04-04-96				**Date**	4/4/96	**Date**	4/4/96

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	GRAPHIC	HNu	DESCRIPTION
SS-1	2.0	2.0	5 5 6 7	0 1		0.0 0.0	Silt loam, black (10YR2/1) moist, triable, nonplastic, massive, structureless, noncalcareous, gradual color change to dark brown (10YR3/3).
SS-2	2.0	1.7	6 12 10 8	2 3		0.0 0.5	Sand, coarse, with gravel, yellowish brown (10YR5/8) dry, loose, poorly washed and sorted, abrupt contact at 3.5' with silty clay loam, pebbles, dark brown (10YR3/3) moist-wet, soft, plastic, slightly sticky, massive, structureless, noncalcareous.
SS-3	2.0	2.0	4 7 8 4	4 5		0.0 0.0	Sandy loam, pebbles, dark brown (10YR4/1) moist, triable, plastic, nonsticky, massive, structureless, calcareous.
SS-4	2.0	1.8	12 15 30 50	6 7		0.0 0.0	Loam, pebbles, dark gray (10YR4/1) moist, very hard, nonplastic, nonsticky, massive, structureless, calcareous.
				8			
				9			T.D. 8.0'
				10			
				1			
				2			
				3			
				4			
				5			
				6			
				7			
				8			
				9			
				20			

Remarks

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EARTH TECH
5010 Stone Mill Road, Bloomington, IN 47408, Phone (812) 336-0972, Fax (812) 336-3991

Site	Curtis - Franklin	**Boring No.**	MW-31
Date	04-05-96	**Driller**	A. Schrader
Logged by	M. Lytle	**Elevation**	
Location		**Page**	1 of 1

					Start	Finish
Water Level	8.10					
Time	1445				Time 1400	Time 1445
Date	04-05-96				Date 4/5/96	Date 4/5/96

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	GRAPHIC	HNu	DESCRIPTION
SS-1	2.0	1.5	8 7 8 8	0 1		0.0	Silt loam, black (10YR3/1) moist, friable, nonplastic, massive structureless, noncalcareous contact at 0.5' with silt loam, pebbles, dark yellowish brown (10YR3/4), moist, friable, nonplastic, massive, structureless, noncalcareous.
SS-2	2.0	1.8	8 9 9 10	2 3		0.0 0.0	Silty clay loam, dark yellowish brown (10YR3/4) moist abrupt sand.
SS-3	2.0	1.3	10 11 11 15	4 5		0.0 0.0	Silty clay loam, as 2.0 above, contact at 4.8' with sand, coarse, with gravel, yellowish brown, (10YR5/4) moist-wet, loose, poorly washed and sorted, slightly calcareous.
SS-4	2.0	1.5	11 14 13 15	6 7		0.0 0.0	Sand and gravel, yellowish brown (10YR3/4) moist, wet, poorly washed and sorted.
SS-5	2.0	2.0	12 14 17 18	8 9		0.0 0.0	Sand and gravel, as 6.0' above, saturated.
SS-6	2.0	2.0	13 14 18 18	10 1		0.0 0.0	Sand and gravel, as 8.0' above.
SS-7	2.0	0.8	17 18 31 28	2 3		0.0 0.0	Loam, dark gray (10YR4/1) dry-moist, hard, nonplastic, non sticky, massive, structureless, calcareous.
				4 5		0.0	T.D. 15.0'
				6 7 8 9 20			

Remarks

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E A R T H T E C H

5010 Stone Mill Road, Bloomington, IN 47408, Phone (812) 336-0972, Fax (812) 336-3991

Site	Curtis - Franklin	**Boring No.**	MW-32
Date	04-04-96	**Driller**	A. Schrader
Logged by	M. Lytle	**Elevation**	
Location		**Page**	1 of 1

					Start		Finish	
Water Level	4.90							
Time	0920				Time	1300	Time	1355
Date	04-05-96				Date	4/4/96	Date	4/4/96

SAMPLE	TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	GRAPHIC	HNu	DESCRIPTION
SS-1		2.0	2.0	3 3 4 5	0 1		0.0	Silt loam, black (10YR2/1) wet, very friable, slightly plastic, massive structureless, noncalcareous contact at 1.2' with silt loam, dark brown (10YR3/3), as above.
SS-2		2.0	1.0	3 4 4 6	2 3		0.0	Silty clay loam, pebbles, dark yellowish brown (10YR4/4) moist, friable, plastic, sticky, massive, structureless, noncalcareous, contact at 2.8' peat, black, (10YR2/1) plant debris.
SS-3		2.0	1.3	6 12 20 30	4 5		0.0	Sand and gravel, yellowish brown (10YR5/4) moist, very dense, poorly washed and sorted, slightly calcareous.
SS-4		2.0	1.5	10 13 14 18	6 7		1.0 1.0	Sand and gravel, as 4.0' above, saturated.
SS-5		2.0	2.0	18 20 21 30	8 9		0.5 0.0	Sand and gravel, as 6.0' above, contact at 8.8' with loam, pebbles, dark gray (10YR4/1) moist-dry, hard, massive, structureless, calcareous.
					10		0.0	T.D. 10.50'
					1			
					2			
					3			
					4			
					5			
					6			
					7			
					8			
					9			
					20			

Remarks

10.0-12.0' Drive 3" spoon for permeability sample, sand heaving in angers, will try again.

EARTH TECH

5010 Stone Mill Road, Bloomington, IN 47408, Phone (812) 336-0972, Fax (812) 336-3991

Site	Curtis - Franklin	**Boring No.**	MW-33
Date	04-04-96	**Driller**	A. Schrader
Logged by	M. Lytle	**Elevation**	
Location		**Page**	1 of 1

Water Level	4.55				Start		Finish
Time	0930				Time 1500		Time 1530
Date	04-05-96				Date 4/4/96		Date 4/4/96

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	GRAPHIC	HNu	DESCRIPTION
				0			
SS-1	2.0	1.8	3			0.0	Silt loam, black (10YR2/1) moist, very friable, nonplastic, nonstructureless, massive structureless, noncalcareous, contact at 0.5' with sandy loam, coarse, pebbles, dark yellowish brown (10YR4/4) moist, triable, nonplastic, nonsticky, massive, noncalcareous.
			4	1			
			8				
			10			0.0	
SS-2	2.0	1.5	8	2		0.0	Sand loam, as 0.5' above, abrupt contact at 2.6' with sand and gravel, coarse, yellowish brown (10YR5/4) moist, loose, poorly washed and sorted, slightly calcareous, gradual change in color to dark gray (10YR4/1).
			7	3			
			9				
			11			0.0	
SS-3	2.0	1.6	10	4		0.0	Sand and gravel, dark gray (10YR4/1) saturated, as above.
			10	5			
			11			0.0	
			12				
SS-4	2.0	1.0	9	6			Sand and gravel, as 4.0' above.
			8	7			
			14				
			15	8			
SS-5	2.0	1.5	10			0.5	Sand and gravel, as 4.0' above, contact at 9.2' with loam, coarse, pebbles, dark gray (10YR4/1) moist-dry, very firm, calcareous.
			12	9			
			17			0.0	
			18				
				10			T.D. - 10.8'
				1			
				2			
				3			
				4			
				5			
				6			
				7			
				8			
				9			
				20			

Remarks

EARTH TECH

5010 Stone Mill Road, Bloomington, IN 47408, Phone (812) 336-0972, Fax (812) 336-3991

Site	Curtis - Franklin	**Boring No.**	MW-34
Date	04-05-96	**Driller**	A. Schrader
Logged by	M. Lytle	**Elevation**	
Location		**Page**	1 of 1

Water Level	8.00				**Start**	**Finish**
Time	1200				**Time** 1030	**Time** 1200
Date	04-05-96				**Date** 4/5/96	**Date** 4/5/96

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	GRAPHIC	HNu	DESCRIPTION
SS-1	2.0	1.9	10 15	0			Gravel till, gray, contact at 0.5' with silt loam, pebbles, dark grayish brown (10YR4/2) moist, triable, slightly plastic, slightly sticky, massive, noncalcareous, gradual change in color to dark yellowish brown (10YR3/4).
			20 21	1			
SS-2	2.0	2.0	9 10	2			Silt loam, as 0.5' above, contact at 3.0' with sand, medium to coarse, dark yellowish brown, (10YR3/4) moist, loose, washed and sorted, noncalcareous.
			8 7	3			
SS-3	2.0	1.8	6 7	4			Sand as 3.0' above.
			9 10	5			
SS-4	2.0	1.7	8 10	6		0.6	Sand and gravel, yellowish brown (10YR5/4) moist, loose, poorly washed and sorted.
			12 14	7		1.5	
SS-5	2.0	1.5	10 11	8		1.0	Sand and gravel, as 6.0' above, wet at 9.0'.
			14 13	9		1.0	
SS-6	2.0	2.0	11 12	10			Sand and gravel, as 8.0' above.
			11 10	1		1.0	
SS-7	2.0	1.0	11 10	2			Sand and gravel, as 8.0' above.
			10 10	3		1.5	
				4			
				5			
				6			
SS-8	1.0	1.0	50 50	7			Loam, pebbles, dark gray (10YR4/1) dry, very hard, massive, structureless, calcareous.
				8			T.D. - 18.0'
				9			
				20			

Remarks

Sand heaving in angers 2' at 12'
Due to sand heaving, was forced to anger to 17' to stop it
Tried to sample, but was not successfull from 14 to 17'
till at 15.0'

EARTH TECH

Well Completion Diagram

Well No. MW-31

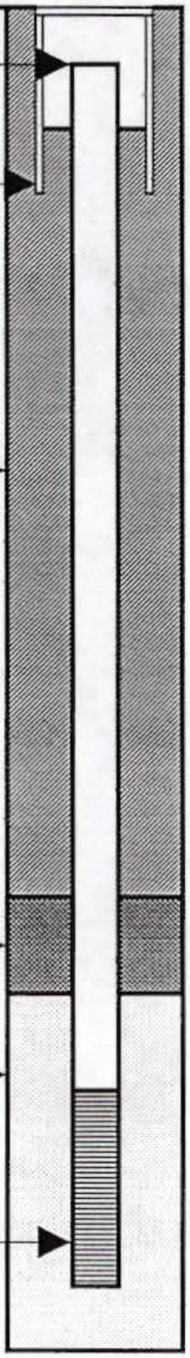
Project Curtis - Franklin

Time & Date: Start 4/8/96 1135

Completed 4/8/96 1430

Installed By A. Schrader

Inspected By M. Lytle



Ground Surface ______ FT. (MSL)

Reference Point (Top of Casing) 727.72 FT. (MSL)

Note: Elevation is 0.76 feet lower than true elevation

Guard Pipe

Drilling Metho 6 1/4" HSA
Mobile B-57

Screen:
Type 4" Threaded PVC
Slot Size 0.010
Top Blank 0.03
Bottom Blank 0.20
Total Screen 4.80
Total Length 5.03

Stand Pipe:
Type 4" Threaded PVC
Total Length 10.01

Backfill
Bentonite

6.00 FT.

Bentonite Seal

6.50 FT.

Granular Pack
#4 Quartz
Sand

7.84 FT.

Well Screen

12.64 FT. =	15.04	-	2.70	-	0.20	-	-0.50
	Tot. Pipe		Cut Off		Bot. Blk.		Stick

Bottom of Borehole 13.75 FT.

Well-2.xls

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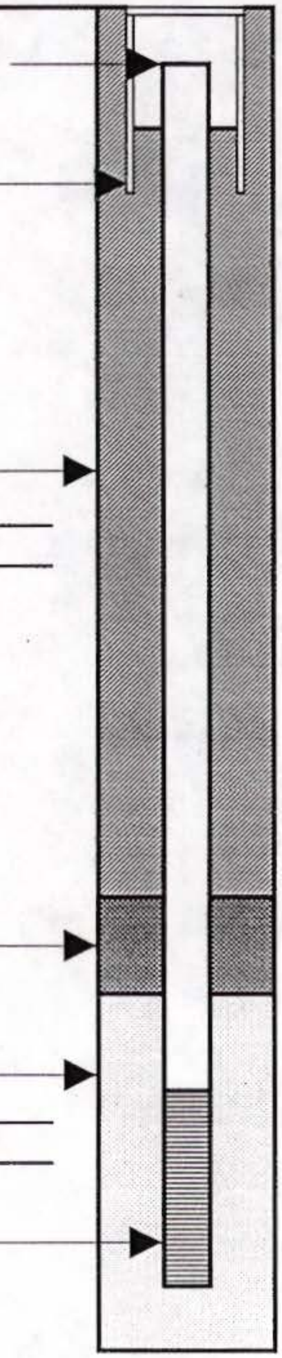
EARTH TECH

Well Completion Diagram

Well No. MW-32
Project Curtis - Franklin
Time & Date: Start 4/4/96 1400
Completed 4/4/96 1450

Installed By A. Schrader
Inspected By M. Lytle



Ground Surface ______ FT. (MSL)

Reference Point (Top of Casing) 721.44 FT. (MSL)

Note: Elevation is 0.76' lower than true elevation

Guard Pipe

Backfill
Bentonite chips

2.00 FT.

Bentonite Seal

3.20 FT.

Granular Pack
#4 Quartz
Sand

4.95 FT.

Well Screen

9.65 FT. = 14.95 (Tot. Pipe) - 5.75 (Cut Off) - 0.15 (Bot. Blk.) - -0.60 (Stick)

Bottom of Borehole 10.50 FT.

Drilling Method 4 1/4" HSA
Mobile B-57

Screen:
Type 2" Threaded PVC
Slot Size 0.01
Top Blank 0.10
Bottom Blank 0.15
Total Screen 4.70
Total Length 4.95

Stand Pipe:
Type 2" Threaded PVC
Total Length 10.00

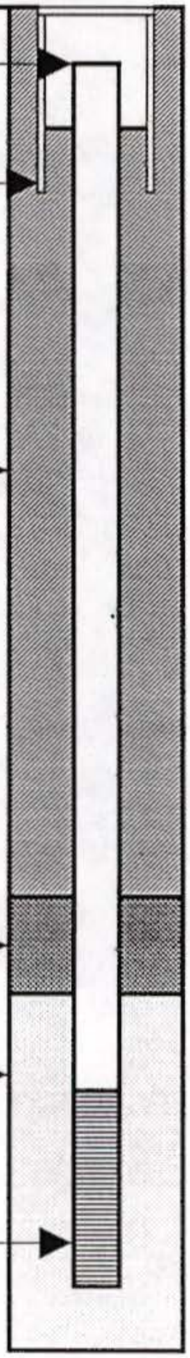
Well-2.xls

EARTH TECH

Well Completion Diagram

Well No. MW-33
Project Curtis - Franklin
Time & Date: Start 4/4/96 1615
Completed 4/4/96 1650

Installed By A. Schrader
Inspected By M. Lytle



Ground Surface ______ FT. (MSL)

Reference Point (Top of Casing) 723.27 FT. (MSL)

Note: Elevation is 0.76' lower than true elevation

Guard Pipe

Drilling Method 4 1/4" HSA
Mobile B-57

Screen:
Type 2" Threaded PVC
Slot Size 0.010
Top Blank 0.12
Bottom Blank 0.15
Total Screen 4.83
Total Length 5.10

Stand Pipe:
Type 2" Threaded PVC
Total Length 10.00

Backfill
Bentonite chips

3.30 FT.

Bentonite Seal

4.32 FT.

Granular Pack
#4 Quartz
Sand

4.92 FT.

Well Screen

9.75 FT. = 15.10 (Tot. Pipe) - 5.50 (Cut Off) - 0.15 (Bot. Blk.) - -0.30 (Stick)

Bottom of Borehole 10.80 FT.

Well-2.xls

EARTH TECH

Well Completion Diagram

Well No. MW-34
Project Curtis - Franklin
Time & Date: Start 4/5/96 1245
Completed 4/5/96 1335

Installed By A. Schrader
Inspected By M. Lytle

Ground Surface ____ FT. (MSL)

Reference Point (Top of Casing) 728.49 FT. (MSL)

Note: Elevation is 0.76' lower than true elevation

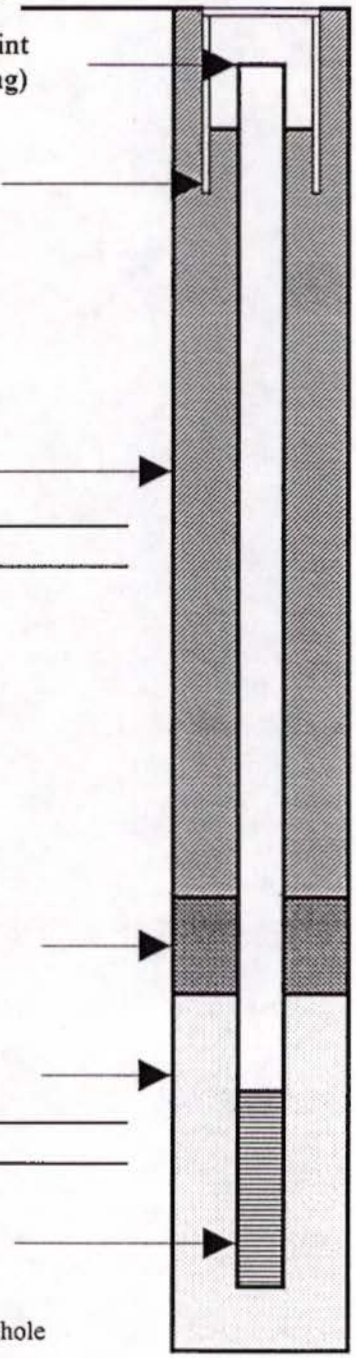
Guard Pipe

Drilling Method 4 1/4" HSA
Mobile B-57

Screen:
Type 2" Threaded PVC
Slot Size 0.010
Top Blank 0.10
Bottom Blank 0.15
Total Screen 4.77
Total Length 5.02

Stand Pipe:
Type 2" Threaded PVC
Total Length 10.00

Backfill
Bentonite



5.00 FT.

Bentonite Seal

8.80 FT.

Granular Pack
#4 Quartz
Sand

10.95 FT.

Well Screen

15.72 FT. =	15.02	-	0.0	-	0.15	-	-0.85
	Tot. Pipe		Cut Off		Bot. Blk.		Stick

Bottom of Borehole 16.0 FT.

Well-2.xls

BL-mh-h:\07026.08\document\wcd\MW-34.xls

EARTH TECH

Well Completion Diagram

Well No. P-1

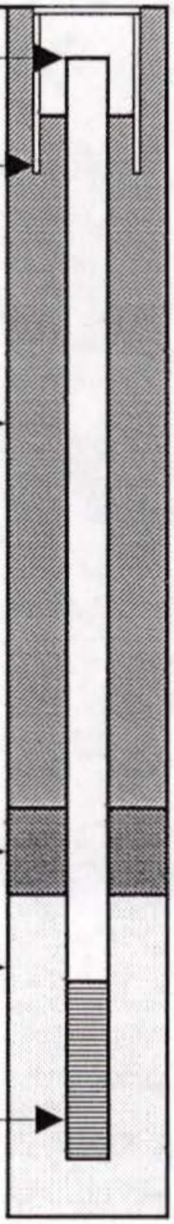
Project Curtis - Franklin

Time & Date: Start 4/5/96 1445

Completed 4/5/96 1539

Installed By A. Schrader

Inspected By M. Lytle



Ground Surface ______ FT. (MSL)

Reference Point (Top of Casing) ______ FT. (MSL)

Guard Pipe

Drilling Method 4 1/4" HSA
Mobile B-57

Screen:
Type 2" Threaded PVC
Slot Size 0.010
Top Blank 0.37
Bottom Blank 0.15
Total Screen 4.53
Total Length 5.05

Backfill
Bentonite

Stand Pipe:
Type 2" Threaded PVC
Total Length 10.00

6.50 FT.

Bentonite Seal

7.70 FT.

Granular Pack
#4 Quartz
Sand

9.97 FT. ______ FT. (MSL)

Well Screen

14.50 FT. =	15.05	-	1.00	-	0.15	-	-0.6
	Tot. Pipe		Cut Off		Bot. Blk.		Stick

Bottom of Borehole 15.00 FT.

Well-2.xls

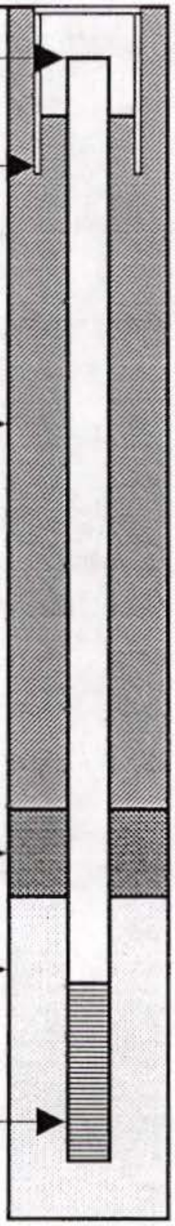
BL-mh-h:\07026.08\document\wcd\P-1.xls

EARTH TECH

Well Completion Diagram

Well No. P-2
Project Curtis - Franklin
Time & Date: Start 4/8/96 0950
Completed 4/8/96 1050

Installed By A. Schrader
Inspected By M. Lytle



Ground Surface ______ FT. (MSL)

Reference Point (Top of Casing) ______ FT. (MSL)

Guard Pipe

Backfill
Bentonite

4.50 FT.

Bentonite Seal

6.98 FT.

Granular Pack
#4 Quartz
Sand

8.93 FT. ______ FT. (MSL)

Well Screen

13.41 FT. = 15.06 Tot. Pipe - 2.00 Cut Off - 0.15 Bot. Blk. - -0.50 Stick

Bottom of Borehole 13.50 FT.

Drilling Method 4 1/4" HSA
Mobile B-57

Screen:
Type 2" Threaded PVC
Slot Size 0.010
Top Blank 0.37
Bottom Blank 0.15
Total Screen 4.48
Total Length 5.00

Stand Pipe:
Type 2" Threaded PVC
Total Length 10.01

Well-2.xls

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. ALBANY SUITE C BROKEN ARROW, OK 74012-1421 (918) 251-2858

Client Name: Earth Tech
5010 Stone Mill Road
Bloomington, IN 47408

Client ID:	MW-33 9.0'-9.5'	Project ID:	FRANKLIN SITE
SWLO ID:	25173.04	Report:	25173.04

Collected: 04/04/1996 Report Date: 05/01/1996 Page: 1
Received: 04/06/1996 Last Modified: Matrix: Soil

TEST	DATE EXTRACTED	DETECTION LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
		*** INORGANICS ***				
AMENABLE CN	04/17/96	0.50	mg/kg	0.91	04/17/96	SM 412F/SW 9010

APPLICABLE TESTS ARE REPORTED ON WET WEIGHT BASIS

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
N = NOT APPLICABLE
odology: SM = STANDARD METHODS, 16th EDITION, 1985
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, NOVEMBER 1986

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. ALBANY SUITE C BROKEN ARROW, OK 74012-1421 (918) 251-2858

Client Name: Earth Tech
5010 Stone Mill Road
Bloomington, IN 47408

Client ID:	MW-32 6.0'-8.0'	Project ID:	FRANKLIN SITE
SWLO ID:	25173.01	Report:	25173.01

Collected: 04/04/1996 Report Date: 05/01/1996 Page: 1
Received: 04/06/1996 Last Modified: Matrix: Soil

TEST	DATE EXTRACTED	DETECTION LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
		*** INORGANICS ***				
AMENABLE CN	04/12/96	0.50	mg/kg	1.1	04/16/96	SM 412F/SW 9010

APPLICABLE TESTS ARE REPORTED ON WET WEIGHT BASIS

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NOT APPLICABLE
M[illegible]odology: SM = STANDARD METHODS, 16th EDITION, 1985
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, NOVEMBER 1986

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. ALBANY SUITE C BROKEN ARROW, OK 74012-1421 (918) 251-2858

Client Name: Earth Tech
5010 Stone Mill Road
Bloomington, IN 47408

Client ID:	MW-32 8.8'-9.3'	Project ID:	FRANKLIN SITE
SWLO ID:	25173.02	Report:	25173.02

Collected: 04/04/1996 Report Date: 05/01/1996 Page: 1
Received: 04/06/1996 Last Modified: Matrix: Soil

TEST	DATE EXTRACTED	DETECTION LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
		*** INORGANICS ***				
AMENABLE CN	04/17/96	0.50	mg/kg	0.80	04/17/96	SM 412F/SW 9010

APPLICABLE TESTS ARE REPORTED ON WET WEIGHT BASIS

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
= NOT APPLICABLE

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

odology: SM = STANDARD METHODS, 16th EDITION, 1985
EPA = #EPA600/4-79-020, MARCH 1985

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, NOVEMBER 1986

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. ALBANY SUITE C BROKEN ARROW, OK 74012-1421 (918) 251-2858

Client Name: Earth Tech
5010 Stone Mill Road
Bloomington, IN 47408

Client ID:	MW-34 6.0'-8.0'	Project ID:	FRANKLIN SITE
SWLO ID:	25173.05	Report:	25173.05

Collected: 04/05/1996 Report Date: 05/01/1996 Page: 1
Received: 04/06/1996 Last Modified: Matrix: Soil

TEST	DATE EXTRACTED	DETECTION LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
		*** INORGANICS ***				
AMENABLE CN	04/12/96	0.50	mg/kg	0.61	04/16/96	SM 412F/SW 9010

APPLICABLE TESTS ARE REPORTED ON WET WEIGHT BASIS

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
= NOT APPLICABLE
odology: SM = STANDARD METHODS, 16th EDITION, 1985
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, NOVEMBER 1986

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. ALBANY SUITE C BROKEN ARROW, OK 74012-1421 (918) 251-2858

Client Name: Earth Tech
5010 Stone Mill Road
Bloomington, IN 47408

Client ID:	MW-34 17.0'-17.5'	Project ID:	FRANKLIN SITE
SWLO ID:	25173.06	Report:	25173.06

Collected: 04/05/1996 Report Date: 05/01/1996 Page: 1
Received: 04/06/1996 Last Modified: Matrix: Soil

TEST	DATE EXTRACTED	DETECTION LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
		*** INORGANICS ***				
AMENABLE CN	04/12/96	0.50	mg/kg	1.2	04/16/96	SM 412F/SW 9010

APPLICABLE TESTS ARE REPORTED ON WET WEIGHT BASIS

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
- NOT APPLICABLE
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

odology: SM = STANDARD METHODS, 16th EDITION, 1985
EPA = #EPA600/4-79-020, MARCH 1985
SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, NOVEMBER 1986

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. ALBANY SUITE C BROKEN ARROW, OK 74012-1421 (918) 251-2858

Client Name: Earth Tech
5010 Stone Mill Road
Bloomington, IN 47408

Client ID:	MW-31 6.0'-8.0'	Project ID:	FRANKLIN SITE
SWLO ID:	25173.07	Report:	25173.07

Collected: 04/05/1996 Report Date: 05/01/1996 Page: 1
Received: 04/06/1996 Last Modified: Matrix: Soil

TEST	DATE EXTRACTED	DETECTION LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
		*** INORGANICS ***				
AMENABLE CN	04/17/96	0.50	mg/kg	ND	04/17/96	SM 412F/SW 9010

APPLICABLE TESTS ARE REPORTED ON WET WEIGHT BASIS

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NOT APPLICABLE
odology: SM = STANDARD METHODS, 16th EDITION, 1985
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, NOVEMBER 1986

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 W. ALBANY SUITE C BROKEN ARROW, OK 74012-1421 (918) 251-2858

Client Name: Earth Tech
5010 Stone Mill Road
Bloomington, IN 47408

Client ID:	MW-31 6.0'-8.0'	Project ID:	FRANKLIN SITE
SWLO ID:	25173.10 DUP	Report:	25173.10

Collected: 04/05/1996 Report Date: 05/01/1996 Page: 1
Received: 04/06/1996 Last Modified: Matrix: Soil

TEST	DATE EXTRACTED	DETECTION LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
		*** INORGANICS ***				
AMENABLE CN	04/12/96	0.50	mg/kg	0.74	04/16/96	SM 412F/SW 9010

APPLICABLE TESTS ARE REPORTED ON WET WEIGHT BASIS

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NOT APPLICABLE
odology: SM = STANDARD METHODS, 16th EDITION, 1985
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, NOVEMBER 1986

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. ALBANY SUITE C BROKEN ARROW, OK 74012-1421 (918) 251-2858

Client Name: Earth Tech
5010 Stone Mill Road
Bloomington, IN 47408

Client ID: MW-31 14.0'-15.0' Project ID: FRANKLIN SITE

SWLO ID: 25173.11 Report: 25173.11

Collected: 04/05/1996 Report Date: 05/01/1996 Page: 1
Received: 04/06/1996 Last Modified: Matrix: Soil

TEST	DATE EXTRACTED	DETECTION LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
		*** INORGANICS ***				
AMENABLE CN	04/17/96	0.50	mg/kg	0.96	04/23/96	SM 412F/SW 9010

APPLICABLE TESTS ARE REPORTED ON WET WEIGHT BASIS

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NOT APPLICABLE
odology: SM = STANDARD METHODS, 16th EDITION, 1985
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, NOVEMBER 1986

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GW-EB

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25242

Matrix: (soil/water) WATER Lab Sample ID: 25242.11

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: UJ789.D

Level: (low/med) LOW Date Received: 04/12/96

% Moisture: not dec. ________ Date Analyzed: 04/18/96

Soil Extract Volume: _______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	68	B
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
108-88-3	Toluene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	U
540-59-0	1,2-Dichloroethene (total)	5	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GW-EB

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25242

Matrix: (soil/water) WATER Lab Sample ID: 25242.11

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: UJ789.D

Level: (low/med) LOW Date Received: 04/12/96

% Moisture: not dec. ______ Date Analyzed: 04/18/96

Soil Extract Volume: ______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
110-75-8	--------2-Chloroethyl Vinyl Ether__	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
GW-MW-12

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25242

Matrix: (soil/water) WATER Lab Sample ID: 25242.01

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: UJ779.D

Level: (low/med) LOW Date Received: 04/12/96

% Moisture: not dec. ________ Date Analyzed: 04/18/96

Soil Extract Volume: ______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	28	
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	1400	E
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	1900	E
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	2700	E
108-88-3	Toluene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	U
540-59-0	1,2-Dichloroethene (total)	2	J

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GW-MW-12

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25242

Matrix: (soil/water) WATER Lab Sample ID: 25242.01

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: UJ779.D

Level: (low/med) LOW Date Received: 04/12/96

% Moisture: not dec. ______ Date Analyzed: 04/18/96

Soil Extract Volume: ______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
110-75-8	2-Chloroethyl Vinyl Ether	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GW-MW-12DL

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25242

Matrix: (soil/water) WATER Lab Sample ID: 25242.01DL

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: UJ796.D

Level: (low/med) LOW Date Received: 04/12/96

% Moisture: not dec. ________ Date Analyzed: 04/19/96

Soil Extract Volume: ________ (uL) Soil Aliquot Volume: _____ (uL)

Column: (pack/cap) CAP Dilution Factor: 20.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	200	U
74-83-9	Bromomethane	200	U
75-01-4	Vinyl Chloride	200	U
75-00-3	Chloroethane	200	U
75-09-2	Methylene Chloride	100	U
67-64-1	Acetone	200	U
75-15-0	Carbon Disulfide	100	U
75-35-4	1,1-Dichloroethene	100	U
75-34-3	1,1-Dichloroethane	26	JD
67-66-3	Chloroform	100	U
107-06-2	1,2-Dichloroethane	100	U
78-93-3	2-Butanone	200	U
71-55-6	1,1,1-Trichloroethane	1000	D
56-23-5	Carbon Tetrachloride	100	U
108-05-4	Vinyl Acetate	200	U
75-27-4	Bromodichloromethane	100	U
78-87-5	1,2-Dichloropropane	100	U
10061-01-5	cis-1,3-Dichloropropene	100	U
79-01-6	Trichloroethene	1200	D
124-48-1	Dibromochloromethane	100	U
79-00-5	1,1,2-Trichloroethane	100	U
71-43-2	Benzene	100	U
10061-02-6	trans-1,3-Dichloropropene	100	U
75-25-2	Bromoform	100	U
108-10-1	4-Methyl-2-Pentanone	200	U
591-78-6	2-Hexanone	200	U
127-18-4	Tetrachloroethene	1500	D
108-88-3	Toluene	100	U
79-34-5	1,1,2,2-Tetrachloroethane	100	U
108-90-7	Chlorobenzene	100	U
100-41-4	Ethylbenzene	100	U
100-42-5	Styrene	100	U
1330-20-7	Xylene (Total)	100	U
540-59-0	1,2-Dichloroethene (total)	100	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GW-MW-12DL

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25242

Matrix: (soil/water) WATER Lab Sample ID: 25242.01DL

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: UJ796.D

Level: (low/med) LOW Date Received: 04/12/96

% Moisture: not dec. _______ Date Analyzed: 04/19/96

Soil Extract Volume: _______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 20.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
110-75-8	2-Chloroethyl Vinyl Ether	200	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GW-MW-31

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25242

Matrix: (soil/water) WATER Lab Sample ID: 25242.02

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: UJ780.D

Level: (low/med) LOW Date Received: 04/12/96

% Moisture: not dec. ______ Date Analyzed: 04/18/96

Soil Extract Volume: ______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	3	J
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	70	
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	280	E
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	15	
108-88-3	Toluene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	U
540-59-0	1,2-Dichloroethene (total)	5	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GW-MW-31

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25242

Matrix: (soil/water) WATER Lab Sample ID: 25242.02

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: UJ780.D

Level: (low/med) LOW Date Received: 04/12/96

% Moisture: not dec. ______ Date Analyzed: 04/18/96

Soil Extract Volume: ______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
110-75-8	2-Chloroethyl Vinyl Ether	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GW-MW-31DL

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25242

Matrix: (soil/water) WATER Lab Sample ID: 25242.02DL

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: UJ797.D

Level: (low/med) LOW Date Received: 04/12/96

% Moisture: not dec. ________ Date Analyzed: 04/19/96

Soil Extract Volume: ________(uL) Soil Aliquot Volume: ______(uL)

Column: (pack/cap) CAP Dilution Factor: 2.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	20	U
74-83-9	Bromomethane	20	U
75-01-4	Vinyl Chloride	20	U
75-00-3	Chloroethane	20	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	20	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	2	JD
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	20	U
71-55-6	1,1,1-Trichloroethane	37	D
56-23-5	Carbon Tetrachloride	10	U
108-05-4	Vinyl Acetate	20	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	130	D
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	20	U
591-78-6	2-Hexanone	20	U
127-18-4	Tetrachloroethene	4	JD
108-88-3	Toluene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (Total)	10	U
540-59-0	1,2-Dichloroethene (total)	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GW-MW-31DL

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25242

Matrix: (soil/water) WATER Lab Sample ID: 25242.02DL

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: UJ797.D

Level: (low/med) LOW Date Received: 04/12/96

% Moisture: not dec. ______ Date Analyzed: 04/19/96

Soil Extract Volume: ______(uL) Soil Aliquot Volume: ____(uL)

Column: (pack/cap) CAP Dilution Factor: 2.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
110-75-8	2-Chloroethyl Vinyl Ether	20	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GW-MW-32

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25242

Matrix: (soil/water) WATER Lab Sample ID: 25242.05

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: UJ783.D

Level: (low/med) LOW Date Received: 04/12/96

% Moisture: not dec. ______ Date Analyzed: 04/18/96

Soil Extract Volume: ______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	2	J
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	2	J
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	1	J
108-88-3	Toluene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	U
540-59-0	1,2-Dichloroethene (total)	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GW-MW-32

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25242

Matrix: (soil/water) WATER Lab Sample ID: 25242.05

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: UJ783.D

Level: (low/med) LOW Date Received: 04/12/96

% Moisture: not dec. ______ Date Analyzed: 04/18/96

Soil Extract Volume: ______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
110-75-8	--------2-Chloroethyl Vinyl Ether___	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GW-MW-33

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25242

Matrix: (soil/water) WATER Lab Sample ID: 25242.06

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: UJ784.D

Level: (low/med) LOW Date Received: 04/12/96

% Moisture: not dec. ______ Date Analyzed: 04/18/96

Soil Extract Volume: ______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
108-88-3	Toluene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	U
540-59-0	1,2-Dichloroethene (total)	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GW-MW-33

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25242

Matrix: (soil/water) WATER Lab Sample ID: 25242.06

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: UJ784.D

Level: (low/med) LOW Date Received: 04/12/96

% Moisture: not dec. ______ Date Analyzed: 04/18/96

Soil Extract Volume: ______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
110-75-8	2-Chloroethyl Vinyl Ether	10	U

FORM I VOA

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GW-MW-34

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25242

Matrix: (soil/water) WATER Lab Sample ID: 25242.07

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: UJ785.D

Level: (low/med) LOW Date Received: 04/12/96

% Moisture: not dec. ________ Date Analyzed: 04/18/96

Soil Extract Volume: _______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	2	J
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	75	
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	250	E
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	11	
108-88-3	Toluene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	U
540-59-0	1,2-Dichloroethene (total)	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GW-MW-34

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25242

Matrix: (soil/water) WATER Lab Sample ID: 25242.07

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: UJ785.D

Level: (low/med) LOW Date Received: 04/12/96

% Moisture: not dec. ______ Date Analyzed: 04/18/96

Soil Extract Volume: ______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
110-75-8	--------2-Chloroethyl Vinyl Ether___	10	U

FORM I VOA

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
GW-MW-34DL

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25242

Matrix: (soil/water) WATER Lab Sample ID: 25242.07DL

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: UJ798.D

Level: (low/med) LOW Date Received: 04/12/96

% Moisture: not dec. ______ Date Analyzed: 04/19/96

Soil Extract Volume: ______(uL) Soil Aliquot Volume: ______(uL)

Column: (pack/cap) CAP Dilution Factor: 2.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	20	U
74-83-9	Bromomethane	20	U
75-01-4	Vinyl Chloride	20	U
75-00-3	Chloroethane	20	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	20	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	20	U
71-55-6	1,1,1-Trichloroethane	39	D
56-23-5	Carbon Tetrachloride	10	U
108-05-4	Vinyl Acetate	20	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	120	D
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	20	U
591-78-6	2-Hexanone	20	U
127-18-4	Tetrachloroethene	4	JD
108-88-3	Toluene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (Total)	10	U
540-59-0	1,2-Dichloroethene (total)	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GW-MW-34DL

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25242

Matrix: (soil/water) WATER Lab Sample ID: 25242.07DL

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: UJ798.D

Level: (low/med) LOW Date Received: 04/12/96

% Moisture: not dec. ________ Date Analyzed: 04/19/96

Soil Extract Volume: _______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 2.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
110-75-8	--------2-Chloroethyl Vinyl Ether___	20	U

FORM I VOA

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
GW-MW-34D

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25242

Matrix: (soil/water) WATER Lab Sample ID: 25242.10

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: UJ788.D

Level: (low/med) LOW Date Received: 04/12/96

% Moisture: not dec. ________ Date Analyzed: 04/18/96

Soil Extract Volume: ________(uL) Soil Aliquot Volume: ______(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	2	J
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	73	
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	240	E
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	
108-88-3	Toluene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	U
540-59-0	1,2-Dichloroethene (total)	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GW-MW-34D

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25242

Matrix: (soil/water) WATER Lab Sample ID: 25242.10

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: UJ788.D

Level: (low/med) LOW Date Received: 04/12/96

% Moisture: not dec. ________ Date Analyzed: 04/18/96

Soil Extract Volume: _______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
110-75-8	2-Chloroethyl Vinyl Ether	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GW-MW-34DDL

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25242

Matrix: (soil/water) WATER Lab Sample ID: 25242.10DL

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: UJ799.D

Level: (low/med) LOW Date Received: 04/12/96

% Moisture: not dec. ______ Date Analyzed: 04/19/96

Soil Extract Volume: ______(uL) Soil Aliquot Volume: ______(uL)

Column: (pack/cap) CAP Dilution Factor: 2.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	20	U
74-83-9	Bromomethane	20	U
75-01-4	Vinyl Chloride	20	U
75-00-3	Chloroethane	20	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	20	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	2	JD
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	20	U
71-55-6	1,1,1-Trichloroethane	48	D
56-23-5	Carbon Tetrachloride	10	U
108-05-4	Vinyl Acetate	20	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	160	D
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	20	U
591-78-6	2-Hexanone	20	U
127-18-4	Tetrachloroethene	6	JD
108-88-3	Toluene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (Total)	10	U
540-59-0	1,2-Dichloroethene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GW-MW-34DDL

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25242

Matrix: (soil/water) WATER Lab Sample ID: 25242.10DL

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: UJ799.D

Level: (low/med) LOW Date Received: 04/12/96

% Moisture: not dec. ______ Date Analyzed: 04/19/96

Soil Extract Volume: ______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 2.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
110-75-8	2-Chloroethyl Vinyl Ether	20	U

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

24202

Lab Name: SOUTHWEST_LAB_OF_OK   Contract:
Lab Code: SWOK   Case No.: 25242   SAS No.:   SDG No.: 25242
Matrix (soil/water): WATER   Lab Sample ID: 2524202
Level (low/med): LOW   Date Received: 04/12/96
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	219			P
7440-36-0	Antimony	2.1	U		P
7440-38-2	Arsenic	1.6	U	W	F
7440-39-3	Barium	52.4			P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	0.50	U		P
7440-70-2	Calcium	103000			P
7440-47-3	Chromium	0.80	U		P
7440-48-4	Cobalt	0.90	U		P
7440-50-8	Copper	0.60	U		P
7439-89-6	Iron	391			P
7439-92-1	Lead	1.3	U		F
7439-95-4	Magnesium	29500			P
7439-96-5	Manganese	30.6			P
7439-97-6	Mercury	0.10	U		AV
7440-02-0	Nickel	0.89	B		P
7440-09-7	Potassium	2010	B		P
7782-49-2	Selenium	2.3	B		F
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	23500			P
7440-28-0	Thallium	0.90	U	W	F
7440-62-2	Vanadium	0.65	B		P
7440-66-6	Zinc	5.3	U		P
	Cyanide	2.0	U		AS

Color Before: COLORLESS   Clarity Before: CLEAR   Texture:
Color After: COLORLESS   Clarity After: CLEAR   Artifacts:

Comments:
CLIENT_ID_=_CMS-GW-MW-31

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
24205

Lab Name: SOUTHWEST_LAB_OF_OK Contract:
Lab Code: SWOK Case No.: 25242 SAS No.: SDG No.: 25242
Matrix (soil/water): WATER Lab Sample ID: 2524205
Level (low/med): LOW Date Received: 04/12/96
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	173			P
7440-36-0	Antimony	2.1	U		P
7440-38-2	Arsenic	1.6	U		F
7440-39-3	Barium	44.3			P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	0.50	U		P
7440-70-2	Calcium	85100			P
7440-47-3	Chromium	0.80	U		P
7440-48-4	Cobalt	0.90	U		P
7440-50-8	Copper	0.61	B		P
7439-89-6	Iron	343			P
7439-92-1	Lead	1.3	U	W	F
7439-95-4	Magnesium	25700			P
7439-96-5	Manganese	11.8			P
7439-97-6	Mercury	0.10	U		AV
7440-02-0	Nickel	0.80	U		P
7440-09-7	Potassium	730	B		P
7782-49-2	Selenium	3.2	B		F
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	11900			P
7440-28-0	Thallium	0.90	U	W	F
7440-62-2	Vanadium	0.52	B		P
7440-66-6	Zinc	5.3	U		P
	Cyanide	2.0	U		AS

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID_=_CMS-GW-MW-32

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
24206

Lab Name: SOUTHWEST_LAB_OF_OK Contract:
Lab Code: SWOK Case No.: 25242 SAS No.: SDG No.: 25242
Matrix (soil/water): WATER Lab Sample ID: 2524206
Level (low/med): LOW Date Received: 04/12/96
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	297			P
7440-36-0	Antimony	2.1	U		P
7440-38-2	Arsenic	1.6	U		F
7440-39-3	Barium	86.7			P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	0.50	U		P
7440-70-2	Calcium	100000			P
7440-47-3	Chromium	0.80	U		P
7440-48-4	Cobalt	0.90	U		P
7440-50-8	Copper	1.1	B		P
7439-89-6	Iron	514			P
7439-92-1	Lead	1.3	U	W	F
7439-95-4	Magnesium	31600			P
7439-96-5	Manganese	108			P
7439-97-6	Mercury	0.10	U		AV
7440-02-0	Nickel	1.9	B		P
7440-09-7	Potassium	1230	B		P
7782-49-2	Selenium	2.0	U		F
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	8910			P
7440-28-0	Thallium	0.90	U		F
7440-62-2	Vanadium	0.78	B		P
7440-66-6	Zinc	5.5	B		P
	Cyanide	2.0	U		AS

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID_=_CMS-GW-MW-33

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
24207

Lab Name: SOUTHWEST_LAB_OF_OK Contract:
Lab Code: SWOK Case No.: 25242 SAS No.: SDG No.: 25242
Matrix (soil/water): WATER Lab Sample ID: 2524207
Level (low/med): LOW Date Received: 04/12/96
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	122			P
7440-36-0	Antimony	2.1	U		P
7440-38-2	Arsenic	1.6	U		F
7440-39-3	Barium	58.8			P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	0.50	U		P
7440-70-2	Calcium	90200			P
7440-47-3	Chromium	0.80	U		P
7440-48-4	Cobalt	0.90	U		P
7440-50-8	Copper	0.60	U		P
7439-89-6	Iron	329			P
7439-92-1	Lead	1.8	B		F
7439-95-4	Magnesium	25000			P
7439-96-5	Manganese	109			P
7439-97-6	Mercury	0.10	U		AV
7440-02-0	Nickel	1.0	B		P
7440-09-7	Potassium	1790	B		P
7782-49-2	Selenium	3.8	B		F
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	11500			P
7440-28-0	Thallium	0.90	U	W	F
7440-62-2	Vanadium	0.50	B		P
7440-66-6	Zinc	5.3	U		P
	Cyanide	2.0	U		AS

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID_=_CMS-GW-MW-34

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
24210

Lab Name: SOUTHWEST_LAB_OF_OK Contract:
Lab Code: SWOK Case No.: 25242 SAS No.: SDG No.: 25242
Matrix (soil/water): WATER Lab Sample ID: 2524210
Level (low/med): LOW Date Received: 04/12/96
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	198			P
7440-36-0	Antimony	2.1	U		P
7440-38-2	Arsenic	1.6	U		F
7440-39-3	Barium	58.2			P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	0.50	U		P
7440-70-2	Calcium	89000			P
7440-47-3	Chromium	0.80	U		P
7440-48-4	Cobalt	0.90	U		P
7440-50-8	Copper	0.79	B		P
7439-89-6	Iron	536			P
7439-92-1	Lead	1.3	U		F
7439-95-4	Magnesium	24700			P
7439-96-5	Manganese	117			P
7439-97-6	Mercury	0.10	U		AV
7440-02-0	Nickel	1.4	B		P
7440-09-7	Potassium	1740	B		P
7782-49-2	Selenium	3.2	B		F
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	10900			P
7440-28-0	Thallium	0.90	U	W	F
7440-62-2	Vanadium	0.67	B		P
7440-66-6	Zinc	5.3	U		P
	Cyanide	2.0	U		AS

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID_=_CMS-GW-MW-34D

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
24211

Lab Name: SOUTHWEST_LAB_OF_OK Contract:
Lab Code: SWOK Case No.: 25242 SAS No.: SDG No.: 25242
Matrix (soil/water): WATER Lab Sample ID: 2524211
Level (low/med): LOW Date Received: 04/12/96
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	18.0	U		P
7440-36-0	Antimony	2.1	U		P
7440-38-2	Arsenic	1.6	U		F
7440-39-3	Barium	2.7	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	0.50	U		P
7440-70-2	Calcium	199	B		P
7440-47-3	Chromium	0.80	U		P
7440-48-4	Cobalt	0.90	U		P
7440-50-8	Copper	2.3	B		P
7439-89-6	Iron	32.0	U		P
7439-92-1	Lead	1.3	U		F
7439-95-4	Magnesium	62.0	U		P
7439-96-5	Manganese	0.70	U		P
7439-97-6	Mercury	0.10	U		AV
7440-02-0	Nickel	2.9	B		P
7440-09-7	Potassium	160	U		P
7782-49-2	Selenium	2.0	U		F
7440-22-4	Silver	1.2	U		P
7440-23-5	Sodium	340	U		P
7440-28-0	Thallium	0.90	U		F
7440-62-2	Vanadium	0.50	U		P
7440-66-6	Zinc	5.3	U		P
	Cyanide	2.0	U		AS

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID_=_CMS-GW-EB

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW3160-80

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25173

Matrix: (soil/water) SOIL Lab Sample ID: 25173.07

Sample wt/vol: 5.0 (g/mL) G Lab File ID: I18996.D

Level: (low/med) LOW Date Received: 04/06/96

% Moisture: not dec. 6 Date Analyzed: 04/10/96

Soil Extract Volume: _______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	8	B
67-64-1	Acetone	20	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	3	J
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	4	J
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	5	U
108-88-3	Toluene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW3160-80

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25173

Matrix: (soil/water) SOIL Lab Sample ID: 25173.07

Sample wt/vol: 5.0 (g/mL) G Lab File ID: I18996.D

Level: (low/med) LOW Date Received: 04/06/96

% Moisture: not dec. 6 Date Analyzed: 04/10/96

Soil Extract Volume: ______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
110-75-8	--------2-Chloroethyl Vinyl Ether___	11	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW3160-80DUP

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25173

Matrix: (soil/water) SOIL Lab Sample ID: 25173.10

Sample wt/vol: 5.0 (g/mL) G Lab File ID: I18999.D

Level: (low/med) LOW Date Received: 04/06/96

% Moisture: not dec. 6 Date Analyzed: 04/10/96

Soil Extract Volume: ______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	9	B
67-64-1	Acetone	9	J
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	5	U
108-88-3	Toluene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW3160-80DUP

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25173

Matrix: (soil/water) SOIL Lab Sample ID: 25173.10

Sample wt/vol: 5.0 (g/mL) G Lab File ID: I18999.D

Level: (low/med) LOW Date Received: 04/06/96

% Moisture: not dec. 6 Date Analyzed: 04/10/96

Soil Extract Volume: ______(uL) Soil Aliquot Volume: ____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
110-75-8	--------2-Chloroethyl Vinyl Ether___	11	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-31140-150

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25173

Matrix: (soil/water) SOIL Lab Sample ID: 25173.11

Sample wt/vol: 5.0 (g/mL) G Lab File ID: I19005.D

Level: (low/med) LOW Date Received: 04/06/96

% Moisture: not dec. 7 Date Analyzed: 04/11/96

Soil Extract Volume: _______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	21	B
67-64-1	Acetone	20	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	3	J
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	3	J
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	5	U
108-88-3	Toluene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-31140-150

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25173

Matrix: (soil/water) SOIL Lab Sample ID: 25173.11

Sample wt/vol: 5.0 (g/mL) G Lab File ID: I19005.D

Level: (low/med) LOW Date Received: 04/06/96

% Moisture: not dec. 7 Date Analyzed: 04/11/96

Soil Extract Volume: _______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
110-75-8	2-Chloroethyl Vinyl Ether	11	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-3260-80

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25173

Matrix: (soil/water) SOIL Lab Sample ID: 25173.01

Sample wt/vol: 5.0 (g/mL) G Lab File ID: I18990.D

Level: (low/med) LOW Date Received: 04/06/96

% Moisture: not dec. 13 Date Analyzed: 04/10/96

Soil Extract Volume: _______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	7	B
67-64-1	Acetone	6	J
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
108-88-3	Toluene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (Total)	6	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-3260-80

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25173

Matrix: (soil/water) SOIL Lab Sample ID: 25173.01

Sample wt/vol: 5.0 (g/mL) G Lab File ID: I18990.D

Level: (low/med) LOW Date Received: 04/06/96

% Moisture: not dec. 13 Date Analyzed: 04/10/96

Soil Extract Volume: _______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
110-75-8	2-Chloroethyl Vinyl Ether	11	U

FORM I VOA

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
MW-3288-93

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25173

Matrix: (soil/water) SOIL Lab Sample ID: 25173.02

Sample wt/vol: 5.0 (g/mL) G Lab File ID: I18991.D

Level: (low/med) LOW Date Received: 04/06/96

% Moisture: not dec. 9 Date Analyzed: 04/10/96

Soil Extract Volume: _______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	10	B
67-64-1	Acetone	20	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	5	U
108-88-3	Toluene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-3288-93

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25173

Matrix: (soil/water) SOIL Lab Sample ID: 25173.02

Sample wt/vol: 5.0 (g/mL) G Lab File ID: I18991.D

Level: (low/med) LOW Date Received: 04/06/96

% Moisture: not dec. 9 Date Analyzed: 04/10/96

Soil Extract Volume: ______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
110-75-8	2-Chloroethyl Vinyl Ether	11	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-3360-70

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25173

Matrix: (soil/water) SOIL Lab Sample ID: 25173.03

Sample wt/vol: 5.0 (g/mL) G Lab File ID: I18992.D

Level: (low/med) LOW Date Received: 04/06/96

% Moisture: not dec. 6 Date Analyzed: 04/10/96

Soil Extract Volume: _______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	8	B
67-64-1	Acetone	12	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	5	U
108-88-3	Toluene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-3360-70

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25173

Matrix: (soil/water) SOIL Lab Sample ID: 25173.03

Sample wt/vol: 5.0 (g/mL) G Lab File ID: I18992.D

Level: (low/med) LOW Date Received: 04/06/96

% Moisture: not dec. 6 Date Analyzed: 04/10/96

Soil Extract Volume: ______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
110-75-8	--------2-Chloroethyl Vinyl Ether___	11	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-3390-95

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25173

Matrix: (soil/water) SOIL Lab Sample ID: 25173.04

Sample wt/vol: 5.0 (g/mL) G Lab File ID: I18993.D

Level: (low/med) LOW Date Received: 04/06/96

% Moisture: not dec. 8 Date Analyzed: 04/10/96

Soil Extract Volume: _______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	12	B
67-64-1	Acetone	27	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	5	U
108-88-3	Toluene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-3390-95

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25173

Matrix: (soil/water) SOIL Lab Sample ID: 25173.04

Sample wt/vol: 5.0 (g/mL) G Lab File ID: I18993.D

Level: (low/med) LOW Date Received: 04/06/96

% Moisture: not dec. 8 Date Analyzed: 04/10/96

Soil Extract Volume: _______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
110-75-8	--------2-Chloroethyl Vinyl Ether___	11	U

FORM I VOA

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-3460-80

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25173

Matrix: (soil/water) SOIL Lab Sample ID: 25173.05

Sample wt/vol: 5.0 (g/mL) G Lab File ID: I18994.D

Level: (low/med) LOW Date Received: 04/06/96

% Moisture: not dec. 4 Date Analyzed: 04/10/96

Soil Extract Volume: _______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	7	B
67-64-1	Acetone	6	J
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	8	
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	2	J
108-88-3	Toluene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-3460-80

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25173

Matrix: (soil/water) SOIL Lab Sample ID: 25173.05

Sample wt/vol: 5.0 (g/mL) G Lab File ID: I18994.D

Level: (low/med) LOW Date Received: 04/06/96

% Moisture: not dec. 4 Date Analyzed: 04/10/96

Soil Extract Volume: ______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
110-75-8	2-Chloroethyl Vinyl Ether	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-34170-175

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25173

Matrix: (soil/water) SOIL Lab Sample ID: 25173.06

Sample wt/vol: 5.0 (g/mL) G Lab File ID: I18995.D

Level: (low/med) LOW Date Received: 04/06/96

% Moisture: not dec. 9 Date Analyzed: 04/10/96

Soil Extract Volume: _______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	15	B
67-64-1	Acetone	37	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	5	J
71-55-6	1,1,1-Trichloroethane	8	
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	37	
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	3	J
108-88-3	Toluene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-34170-175

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25173

Matrix: (soil/water) SOIL Lab Sample ID: 25173.06

Sample wt/vol: 5.0 (g/mL) G Lab File ID: I18995.D

Level: (low/med) LOW Date Received: 04/06/96

% Moisture: not dec. 9 Date Analyzed: 04/10/96

Soil Extract Volume: ______(uL) Soil Aliquot Volume: ____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
110-75-8	2-Chloroethyl Vinyl Ether	11	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

RINSATEBLK

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25173

Matrix: (soil/water) WATER Lab Sample ID: 25173.12

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: N22120.D

Level: (low/med) LOW Date Received: 04/06/96

% Moisture: not dec. ________ Date Analyzed: 04/12/96

Soil Extract Volume: ________(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	6	
67-64-1	Acetone	760	E
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
108-88-3	Toluene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

RINSATEBLK

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25173

Matrix: (soil/water) WATER Lab Sample ID: 25173.12

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: N22120.D

Level: (low/med) LOW Date Received: 04/06/96

% Moisture: not dec. ________ Date Analyzed: 04/12/96

Soil Extract Volume: _______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
110-75-8	2-Chloroethyl Vinyl Ether	10	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
RINSATEBLKDL

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25173

Matrix: (soil/water) WATER Lab Sample ID: 25173.12DL

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: N22130.D

Level: (low/med) LOW Date Received: 04/06/96

% Moisture: not dec. ______ Date Analyzed: 04/12/96

Soil Extract Volume: ______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 5.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	50	U
74-83-9	Bromomethane	50	U
75-01-4	Vinyl Chloride	50	U
75-00-3	Chloroethane	50	U
75-09-2	Methylene Chloride	25	U
67-64-1	Acetone	730	D
75-15-0	Carbon Disulfide	25	U
75-35-4	1,1-Dichloroethene	25	U
75-34-3	1,1-Dichloroethane	25	U
540-59-0	1,2-Dichloroethene (total)	25	U
67-66-3	Chloroform	25	U
107-06-2	1,2-Dichloroethane	25	U
78-93-3	2-Butanone	50	U
71-55-6	1,1,1-Trichloroethane	25	U
56-23-5	Carbon Tetrachloride	25	U
108-05-4	Vinyl Acetate	50	U
75-27-4	Bromodichloromethane	25	U
78-87-5	1,2-Dichloropropane	25	U
10061-01-5	cis-1,3-Dichloropropene	25	U
79-01-6	Trichloroethene	25	U
124-48-1	Dibromochloromethane	25	U
79-00-5	1,1,2-Trichloroethane	25	U
71-43-2	Benzene	25	U
10061-02-6	trans-1,3-Dichloropropene	25	U
75-25-2	Bromoform	25	U
108-10-1	4-Methyl-2-Pentanone	50	U
591-78-6	2-Hexanone	50	U
127-18-4	Tetrachloroethene	25	U
108-88-3	Toluene	25	U
79-34-5	1,1,2,2-Tetrachloroethane	25	U
108-90-7	Chlorobenzene	25	U
100-41-4	Ethylbenzene	25	U
100-42-5	Styrene	25	U
1330-20-7	Xylene (Total)	25	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

RINSATEBLKDL

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: EARTHIN SAS No.: SDG No.: 25173

Matrix: (soil/water) WATER Lab Sample ID: 25173.12DL

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: N22130.D

Level: (low/med) LOW Date Received: 04/06/96

% Moisture: not dec. ________ Date Analyzed: 04/12/96

Soil Extract Volume: _______(uL) Soil Aliquot Volume: _____(uL)

Column: (pack/cap) CAP Dilution Factor: 5.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
110-75-8	2-Chloroethyl Vinyl Ether	50	U

FORM I VOA

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
17307

Lab Name: SOUTHWEST_LAB_OF_OK Contract:
Lab Code: SWOK Case No.: 25173 SAS No.: SDG No.: 25173
Matrix (soil/water): SOIL Lab Sample ID: 2517307
Level (low/med): LOW Date Received: 04/06/96
% Solids: 95.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1700		*	P
7440-36-0	Antimony	2.7	B		P
7440-38-2	Arsenic	2.5			F
7440-39-3	Barium	15.1		*	P
7440-41-7	Beryllium	0.12	B		P
7440-43-9	Cadmium	0.28	B		P
7440-70-2	Calcium	156000			P
7440-47-3	Chromium	4.6		*	P
7440-48-4	Cobalt	2.7			P
7440-50-8	Copper	15.6		*	P
7439-89-6	Iron	10200		E*	P
7439-92-1	Lead	4.0			F
7439-95-4	Magnesium	39200		*	P
7439-96-5	Manganese	637		E*	P
7439-97-6	Mercury	0.04	U		AV
7440-02-0	Nickel	10.3			P
7440-09-7	Potassium	322	B		P
7782-49-2	Selenium	0.29	U	W	F
7440-22-4	Silver	0.30	U		P
7440-23-5	Sodium	167	B		P
7440-28-0	Thallium	0.23	B	W	F
7440-62-2	Vanadium	8.1		*	P
7440-66-6	Zinc	36.2		*	P
	Cyanide	0.33	B		AS

Color Before: BROWN Clarity Before: Texture: COARSE
Color After: YELLOW Clarity After: Artifacts:

Comments:
CLIENT_ID_=_MW-31_6.0'-8.0'

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
17311

Lab Name: SOUTHWEST_LAB_OF_OK______ Contract: __________
Lab Code: SWOK__ Case No.: 25173 SAS No.: ______ SDG No.: 25173_
Matrix (soil/water): SOIL_ Lab Sample ID: 2517311___
Level (low/med): LOW__ Date Received: 04/06/96
% Solids: _91.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3530		*	P
7440-36-0	Antimony	1.8	U		P
7440-38-2	Arsenic	4.6		S	F
7440-39-3	Barium	46.0		*	P
7440-41-7	Beryllium	0.25			P
7440-43-9	Cadmium	0.19	U		P
7440-70-2	Calcium	119000			P
7440-47-3	Chromium	6.4		*	P
7440-48-4	Cobalt	5.0			P
7440-50-8	Copper	14.7		*	P
7439-89-6	Iron	10500		E*	P
7439-92-1	Lead	6.6		S	F
7439-95-4	Magnesium	29500		*	P
7439-96-5	Manganese	260		E*	P
7439-97-6	Mercury	0.04	U		AV
7440-02-0	Nickel	13.8			P
7440-09-7	Potassium	729			P
7782-49-2	Selenium	0.31	U	W	F
7440-22-4	Silver	0.32	U		P
7440-23-5	Sodium	116	B		P
7440-28-0	Thallium	0.30	B	W	F
7440-62-2	Vanadium	9.4		*	P
7440-66-6	Zinc	34.0		*	P
	Cyanide	0.89			AS

Color Before: GREY Clarity Before: ______ Texture: MEDIUM
Color After: YELLOW Clarity After: ______ Artifacts: ______

Comments:
CLIENT_ID_=_MW-31_14.0'-15.0'

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

17301

Lab Name: SOUTHWEST_LAB_OF_OK Contract:
Lab Code: SWOK Case No.: 25173 SAS No.: SDG No.: 25173
Matrix (soil/water): SOIL Lab Sample ID: 2517301
Level (low/med): LOW Date Received: 04/06/96
% Solids: 90.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1200		*	P
7440-36-0	Antimony	3.3	B		P
7440-38-2	Arsenic	1.2			F
7440-39-3	Barium	5.3		*	P
7440-41-7	Beryllium	0.05	B		P
7440-43-9	Cadmium	0.22	B		P
7440-70-2	Calcium	169000			P
7440-47-3	Chromium	3.2		*	P
7440-48-4	Cobalt	1.5	B		P
7440-50-8	Copper	5.4		*	P
7439-89-6	Iron	3850		E*	P
7439-92-1	Lead	3.3			F
7439-95-4	Magnesium	65000		*	P
7439-96-5	Manganese	149		E*	P
7439-97-6	Mercury	0.04	U		AV
7440-02-0	Nickel	2.9	B		P
7440-09-7	Potassium	222	U		P
7782-49-2	Selenium	0.31	U		F
7440-22-4	Silver	0.32	U		P
7440-23-5	Sodium	165	B		P
7440-28-0	Thallium	0.24	U	W	F
7440-62-2	Vanadium	5.7		*	P
7440-66-6	Zinc	12.8		*	P
	Cyanide	1.3			AS

Color Before: BROWN Clarity Before: Texture: COARSE
Color After: YELLOW Clarity After: Artifacts:

Comments:
CLIENT_ID_=_MW-32_6.0'-8.0'

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
17302

Lab Name: SOUTHWEST_LAB_OF_OK Contract:
Lab Code: SWOK Case No.: 25173 SAS No.: SDG No.: 25173
Matrix (soil/water): SOIL Lab Sample ID: 2517302
Level (low/med): LOW Date Received: 04/06/96
% Solids: 89.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4260		*	P
7440-36-0	Antimony	1.8	U		P
7440-38-2	Arsenic	5.3			F
7440-39-3	Barium	32.9		*	P
7440-41-7	Beryllium	0.23			P
7440-43-9	Cadmium	0.19	U		P
7440-70-2	Calcium	93300			P
7440-47-3	Chromium	6.5		*	P
7440-48-4	Cobalt	4.8			P
7440-50-8	Copper	12.7		*	P
7439-89-6	Iron	11900		E*	P
7439-92-1	Lead	5.0			F
7439-95-4	Magnesium	31600		*	P
7439-96-5	Manganese	181		E*	P
7439-97-6	Mercury	0.04	U		AV
7440-02-0	Nickel	18.5			P
7440-09-7	Potassium	854			P
7782-49-2	Selenium	0.31	U	W	F
7440-22-4	Silver	0.32	U		P
7440-23-5	Sodium	117	B		P
7440-28-0	Thallium	0.25	U	W	F
7440-62-2	Vanadium	10.9		*	P
7440-66-6	Zinc	31.7		*	P
	Cyanide	0.89			AS

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: Artifacts:

Comments:
CLIENT_ID = MW-32_8.8'-9.3'

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

17303

Lab Name: SOUTHWEST_LAB_OF_OK Contract:
Lab Code: SWOK Case No.: 25173 SAS No.: SDG No.: 25173
Matrix (soil/water): SOIL Lab Sample ID: 2517303
Level (low/med): LOW Date Received: 04/06/96
% Solids: 86.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1610		*	P
7440-36-0	Antimony	1.9	U		P
7440-38-2	Arsenic	0.52	B	W	F
7440-39-3	Barium	7.2		*	P
7440-41-7	Beryllium	0.08	B		P
7440-43-9	Cadmium	0.20	U		P
7440-70-2	Calcium	63700			P
7440-47-3	Chromium	3.5		*	P
7440-48-4	Cobalt	1.8	B		P
7440-50-8	Copper	7.5		*	P
7439-89-6	Iron	3810		E*	P
7439-92-1	Lead	2.9			F
7439-95-4	Magnesium	20800		*	P
7439-96-5	Manganese	119		E*	P
7439-97-6	Mercury	0.04	U		AV
7440-02-0	Nickel	4.9			P
7440-09-7	Potassium	263	B		P
7782-49-2	Selenium	0.32	U	W	F
7440-22-4	Silver	0.34	U		P
7440-23-5	Sodium	90.8	B		P
7440-28-0	Thallium	0.25	U	W	F
7440-62-2	Vanadium	4.7		*	P
7440-66-6	Zinc	18.5		*	P
	Cyanide	0.21	B		AS

Color Before: BROWN Clarity Before: Texture: COARSE
Color After: YELLOW Clarity After: Artifacts:

Comments:
CLIENT_ID = MW-33 6.0'-7.0'

FORM I - IN

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

17304

Lab Name: SOUTHWEST_LAB_OF_OK Contract:

Lab Code: SWOK Case No.: 25173 SAS No.: SDG No.: 25173

Matrix (soil/water): SOIL Lab Sample ID: 2517304

Level (low/med): LOW Date Received: 04/06/96

% Solids: 90.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2410		*	P
7440-36-0	Antimony	2.8	B		P
7440-38-2	Arsenic	1.3			F
7440-39-3	Barium	21.6		*	P
7440-41-7	Beryllium	0.14	B		P
7440-43-9	Cadmium	0.25	B		P
7440-70-2	Calcium	135000			P
7440-47-3	Chromium	5.0		*	P
7440-48-4	Cobalt	3.7			P
7440-50-8	Copper	8.0		*	P
7439-89-6	Iron	7790		E*	P
7439-92-1	Lead	4.8			F
7439-95-4	Magnesium	54800		*	P
7439-96-5	Manganese	191		E*	P
7439-97-6	Mercury	0.04	U		AV
7440-02-0	Nickel	5.7			P
7440-09-7	Potassium	487	B		P
7782-49-2	Selenium	0.31	U		F
7440-22-4	Silver	0.32	U		P
7440-23-5	Sodium	137	B		P
7440-28-0	Thallium	0.24	U	W	F
7440-62-2	Vanadium	8.0		*	P
7440-66-6	Zinc	17.0		*	P
	Cyanide	1.5			AS

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: Artifacts:

Comments:

CLIENT_ID_=_MW-33_9.0'-9.5'

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

17305

Lab Name: SOUTHWEST_LAB_OF_OK Contract:

Lab Code: SWOK Case No.: 25173 SAS No.: SDG No.: 25173

Matrix (soil/water): SOIL Lab Sample ID: 2517305

Level (low/med): LOW Date Received: 04/06/96

% Solids: 95.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1600		*	P
7440-36-0	Antimony	2.3	B		P
7440-38-2	Arsenic	2.2			F
7440-39-3	Barium	11.4		*	P
7440-41-7	Beryllium	0.11	B		P
7440-43-9	Cadmium	0.27	B		P
7440-70-2	Calcium	174000			P
7440-47-3	Chromium	4.1		*	P
7440-48-4	Cobalt	3.0			P
7440-50-8	Copper	9.9		*	P
7439-89-6	Iron	9910		E*	P
7439-92-1	Lead	3.9			F
7439-95-4	Magnesium	33200		*	P
7439-96-5	Manganese	307		E*	P
7439-97-6	Mercury	0.04	U		AV
7440-02-0	Nickel	10.7			P
7440-09-7	Potassium	240	B		P
7782-49-2	Selenium	0.29	U		F
7440-22-4	Silver	0.30	U		P
7440-23-5	Sodium	176	B		P
7440-28-0	Thallium	0.23	U	W	F
7440-62-2	Vanadium	6.8		*	P
7440-66-6	Zinc	34.6		*	P
	Cyanide	0.64			AS

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: Artifacts:

Comments:

CLIENT_ID_=_MW-34_6.0'-8.0'

FORM I - IN

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
17306

Lab Name: SOUTHWEST_LAB_OF_OK______ Contract: __________
Lab Code: SWOK__ Case No.: 25173 SAS No.: ______ SDG No.: 25173_
Matrix (soil/water): SOIL_ Lab Sample ID: 2517306___
Level (low/med): LOW__ Date Received: 04/06/96
% Solids: _90.4

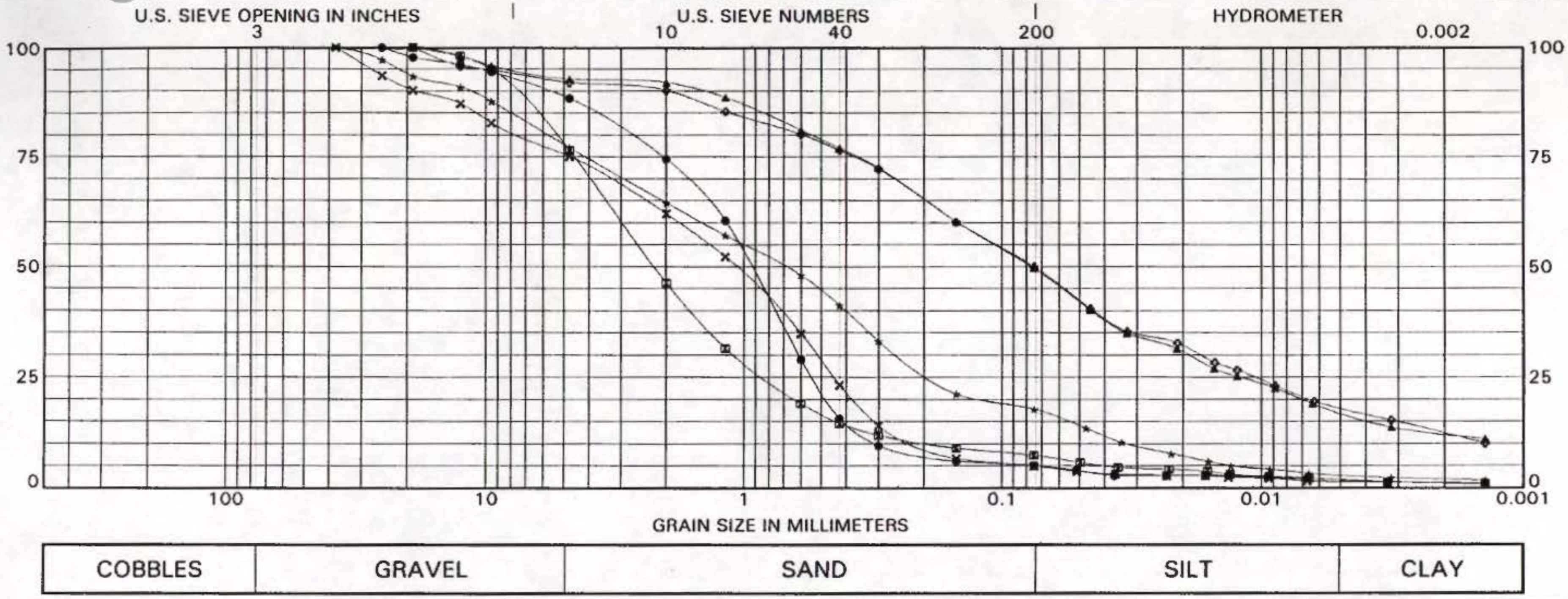
Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4050		*	P
7440-36-0	Antimony	1.8	U		P
7440-38-2	Arsenic	2.8			F
7440-39-3	Barium	46.5		*	P
7440-41-7	Beryllium	0.23			P
7440-43-9	Cadmium	0.31	B		P
7440-70-2	Calcium	85000			P
7440-47-3	Chromium	7.3		*	P
7440-48-4	Cobalt	5.0			P
7440-50-8	Copper	13.5		*	P
7439-89-6	Iron	10900		E*	P
7439-92-1	Lead	5.3			F
7439-95-4	Magnesium	28700		*	P
7439-96-5	Manganese	264		E*	P
7439-97-6	Mercury	0.04	U		AV
7440-02-0	Nickel	13.3			P
7440-09-7	Potassium	837			P
7782-49-2	Selenium	0.31	U		F
7440-22-4	Silver	0.32	U		P
7440-23-5	Sodium	117	B		P
7440-28-0	Thallium	0.24	U		F
7440-62-2	Vanadium	10.5		*	P
7440-66-6	Zinc	33.5		*	P
	Cyanide	1.3			AS

Color Before: GREY Clarity Before: ______ Texture: MEDIUM
Color After: YELLOW Clarity After: ______ Artifacts: ______

Comments:
CLIENT_ID_=_MW-34_17.0'-17.5'

FORM I - IN



	Boring No.	Sample No.	Depth, ft.	USCS Classification[1]	Atterberg Limits[2] LL	PL	PI	% Gravel	% Sand	% Silt	% Clay	% Moisture[3]	Dry Density lbs/cu ft.	Permeability[4] cm/sec	Specific Gravity[5]	pH	CEC meq/100g
●	MW-31	GRAB	8.0 - 8.5	SP-SM, Poorly Graded Sand (visual)				11.7	83.2	3.3	1.8	--					
⊠	MW-31	GRAB	11.5 - 12.0	SW-SM, Well Graded Sand (visual)				23.4	69.2	5.6	1.8	--					
▲	MW-31	S-1	13.0 - 14.0	SC-SM, Clayey Sand (visual)				7.3	43.1	32.5	17.1	10.8	131.1	5.2X10^{-8}			
★	MW-32	GRAB	6.0 - 8.0	SM, Silty Sand (visual)				22.9	59.3	14.9	2.9	--					
×	MW-32	GRAB	8.0 - 8.8	SP-SM, Poorly Graded Sand (visual)				24.9	70.1	3.6	1.4	--					
◇	MW-32	S-1	10.0 - 10.5	CL-ML, Sandy Lean Clay (visual)				8.1	41.9	31.9	18.1	--					

Earth Exploration

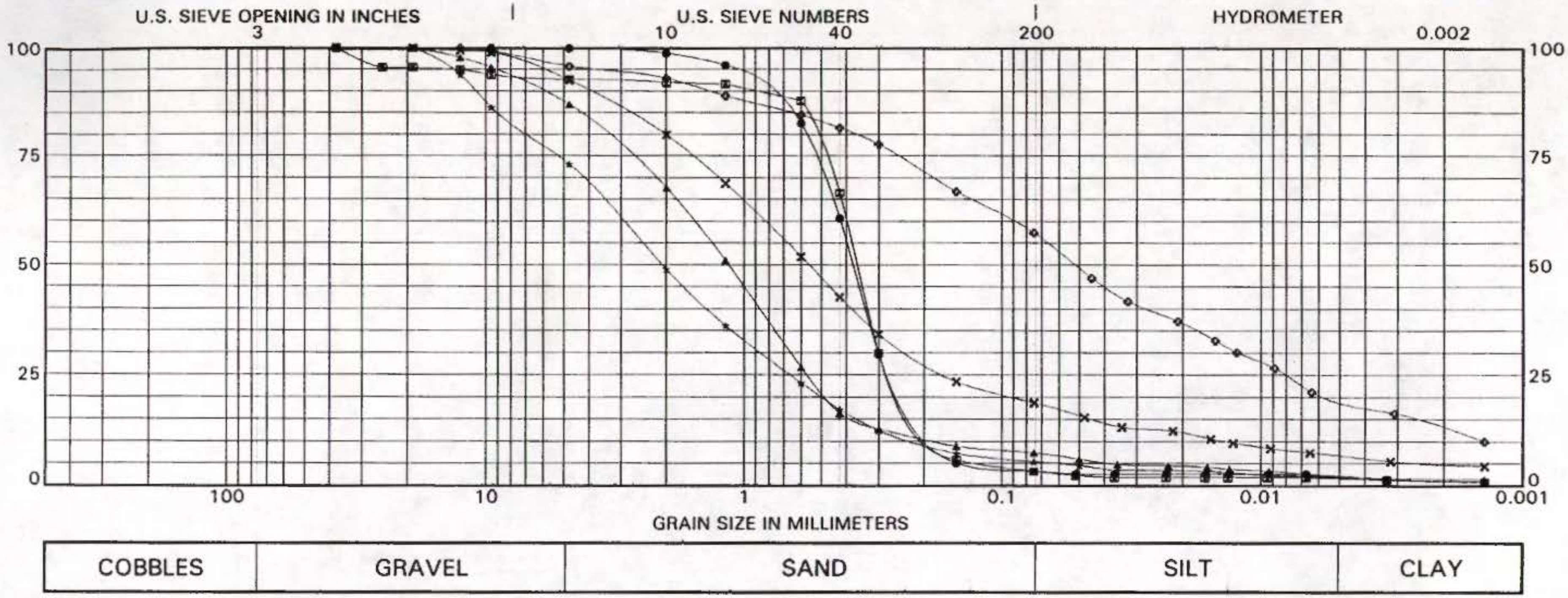
Client Project No. 07026.08
Report Date 4-29-96
EEI Project No. 3831

Project Franklin-Curtis CMS
Location Franklin, Indiana
Client Earth Tech

SUMMARY OF LABORATORY TEST RESULTS

Earth Exploration, Inc.
7770 West New York Street
Indianapolis, Indiana 46214

1 ASTM D 422 & D 2487
2 ASTM D 4318
3 ASTM D 2216
4 ASTM D 5084
5 ASTM D 854



	Boring No.	Sample No.	Depth, ft.	USCS Classification[1]	Atterberg Limits[2]			% Gravel	% Sand	% Silt	% Clay	%[3] Moisture	Dry Density lbs/cu ft.	Permeability[4] cm/sec	Specific Gravity[5]	pH	CEC meq/100g
					LL	PL	PI										
●	MW-33	GRAB	8.0 - 8.5	SP, Poorly Graded Sand (visual)				0.1	96.7	1.1	2.1	--					
⊠	MW-33	GRAB	8.5 - 9.0	SP, Poorly Graded Sand (visual)				7.3	89.5	1.6	1.6	--					
▲	MW-34	GRAB	6.0 - 8.0	SW-SM, Well Graded Sand (visual)				13.1	79.5	5.2	2.2	--					
★	MW-34	GRAB	12.5 - 13.0	SW-SM, Well Graded Sand (visual)				26.9	67.7	3.7	1.7	--					
×	SB-1	GRAB	3.0 - 3.5	SM, Silty Sand (visual)				7.5	73.8	11.9	6.8	--					
○	SB-1	S-1	5.0 - 5.5	CL-ML, Sandy Lean Clay (visual)				4.3	38.3	37.8	19.6	10.6	137.3	4.0×10^{-8}			

Earth Exploration

Client Project No. 07026.08
Report Date 4-29-96
EEI Project No. 3831

Project Franklin-Curtis CMS
Location Franklin, Indiana
Client Earth Tech

SUMMARY OF LABORATORY TEST RESULTS

Earth Exploration, Inc.
7770 West New York Street
Indianapolis, Indiana 46214

1 ASTM D 422 & D 2487
2 ASTM D 4318
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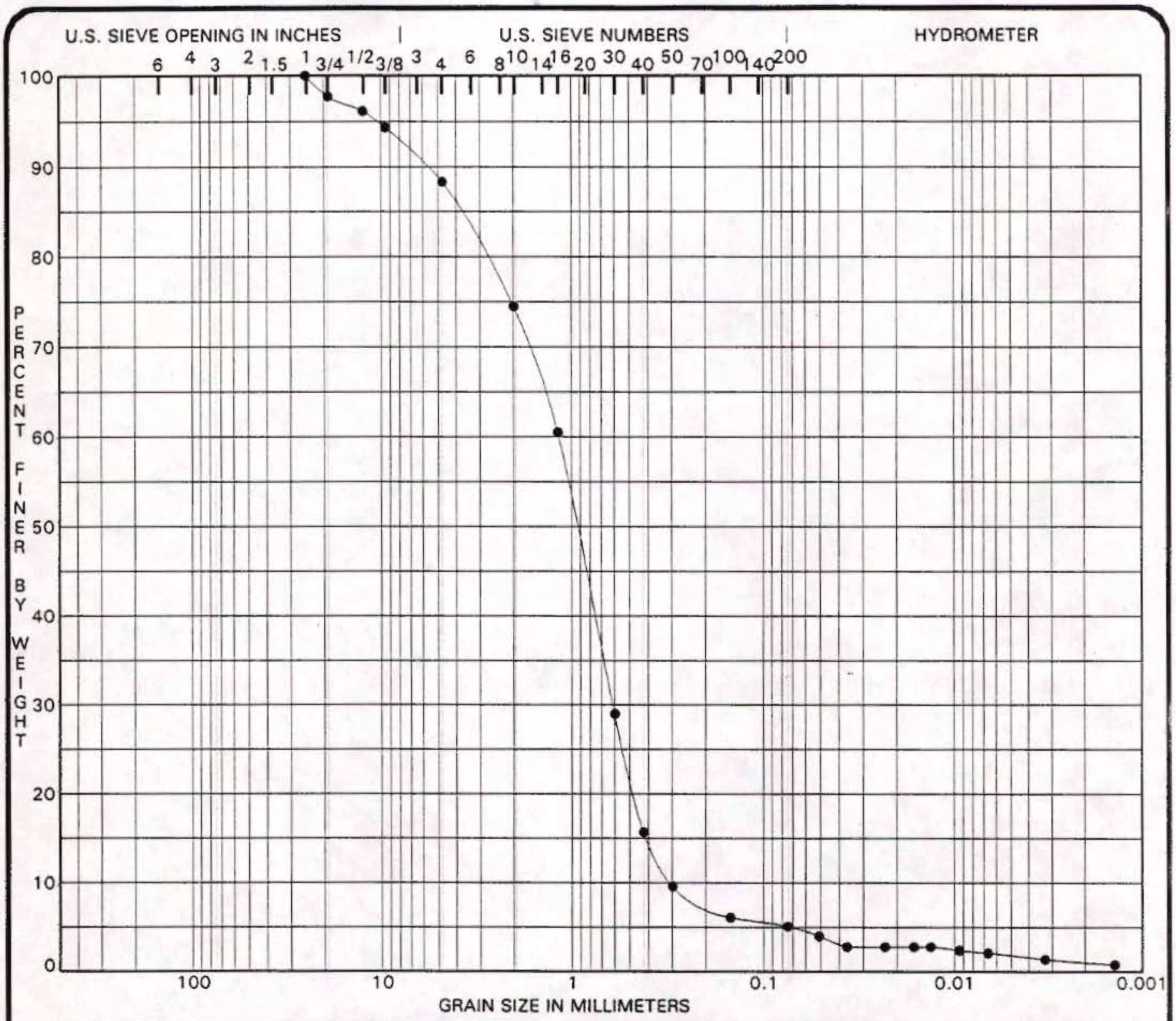


COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample Identification	USCS Classification	MC%	LL	PL	PI	Cc	Cu
● MW-31 GRAB 8'-8.5'	SP-SM, Poorly Graded Sand (visual)	--				1.05	3.8

% Gravel (>4.75mm)	% Sand (4.75 to .075mm)	% Silt (.075 to .005 mm)	% Clay (<.005mm)
11.7	83.2	3.3	1.8

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
64.0		0.5	22.0	0.016	2.8
16.0	97.0	0.25	8.7	0.008	2.3
4.0	85.6	0.125	5.8	0.005	1.8
2.0	74.5	0.075	5.1	0.002	1.0
1.0	52.8	0.050	3.9		

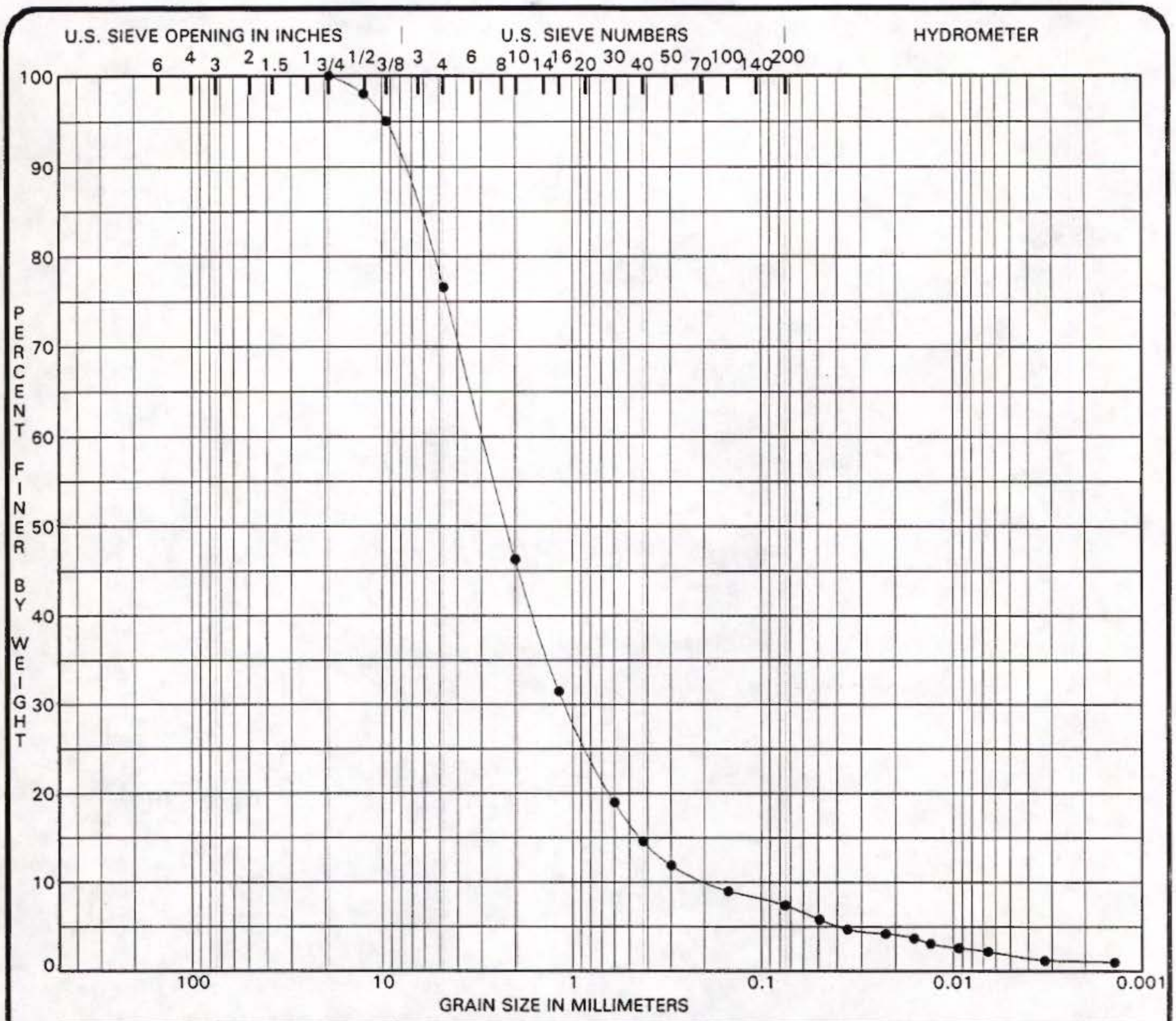
EARTH EXPLORATION Inc

PROJECT Franklin-Curtis CMS
LOCATION Franklin, Indiana
CLIENT Earth Tech
EEI PROJECT NO. 3831

CLIENT ID NO. 07026.08
DATE 4-29-96

GRAIN SIZE DISTRIBUTION CURVE

Earth Exploration, Inc.
7770 West New York Street Indianapolis, Indiana 46214
317-273-1690 / 317-273-2250 (Fax)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample Identification	USCS Classification	MC%	LL	PL	PI	Cc	Cu
● MW-31 GRAB 11.5'-12'	SW-SM, Well Graded Sand (visual)	--				2.10	15.5

% Gravel (>4.75mm)	% Sand (4.75 to .075mm)	% Silt (.075 to .005 mm)	% Clay (<.005mm)
23.4	69.2	5.6	1.8

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
64.0		0.5	16.7	0.016	3.7
16.0	99.2	0.25	11.1	0.008	2.4
4.0	70.6	0.125	8.6	0.005	1.8
2.0	46.3	0.075	7.4	0.002	1.1
1.0	28.4	0.050	5.8		

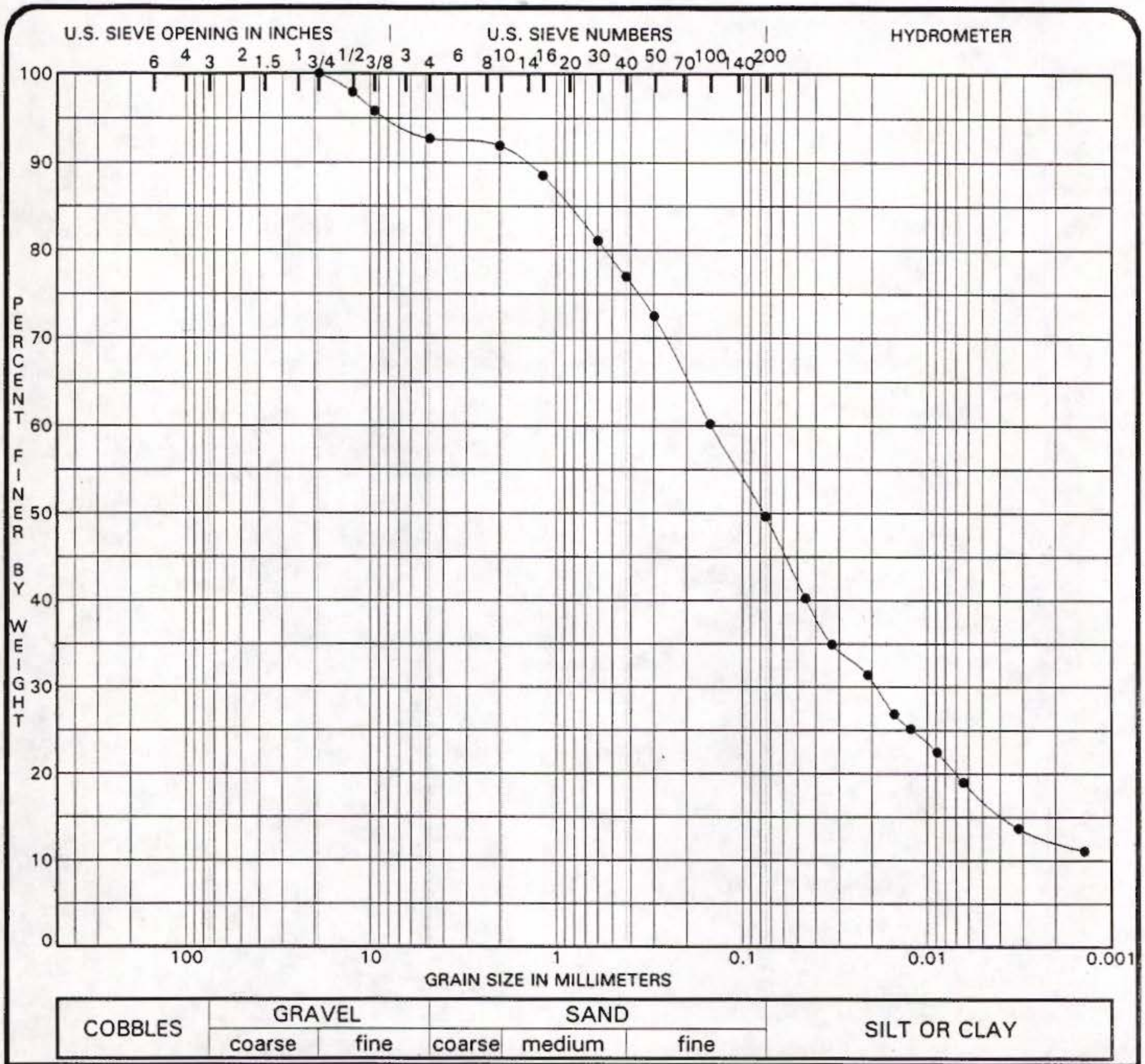
Earth Exploration Inc

PROJECT Franklin-Curtis CMS
LOCATION Franklin, Indiana
CLIENT Earth Tech
EEI PROJECT NO. 3831

CLIENT ID NO. 07026.08
DATE 4-29-96

GRAIN SIZE DISTRIBUTION CURVE

Earth Exploration, Inc.
7770 West New York Street Indianapolis, Indiana 46214
317-273-1690 / 317-273-2250 (Fax)



Sample Identification	USCS Classification	MC%	LL	PL	PI	Cc	Cu
● MW-31 S-1 13'-14'	SC-SM, Clayey Sand (visual)	10.8					

% Gravel (>4.75mm)	% Sand (4.75 to .075mm)	% Silt (.075 to .005 mm)	% Clay (<.005mm)
7.3	43.1	32.5	17.1

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
64.0		0.5	78.9	0.016	27.6
16.0	99.1	0.25	69.3	0.008	21.4
4.0	92.5	0.125	57.4	0.005	17.1
2.0	91.9	0.075	49.6	0.002	12.2
1.0	86.7	0.050	41.9		

EARTH EXPLORATION INC

PROJECT Franklin-Curtis CMS
LOCATION Franklin, Indiana
CLIENT Earth Tech
EEI PROJECT NO. 3831

CLIENT ID NO. 07026.08
DATE 4-29-96

GRAIN SIZE DISTRIBUTION CURVE

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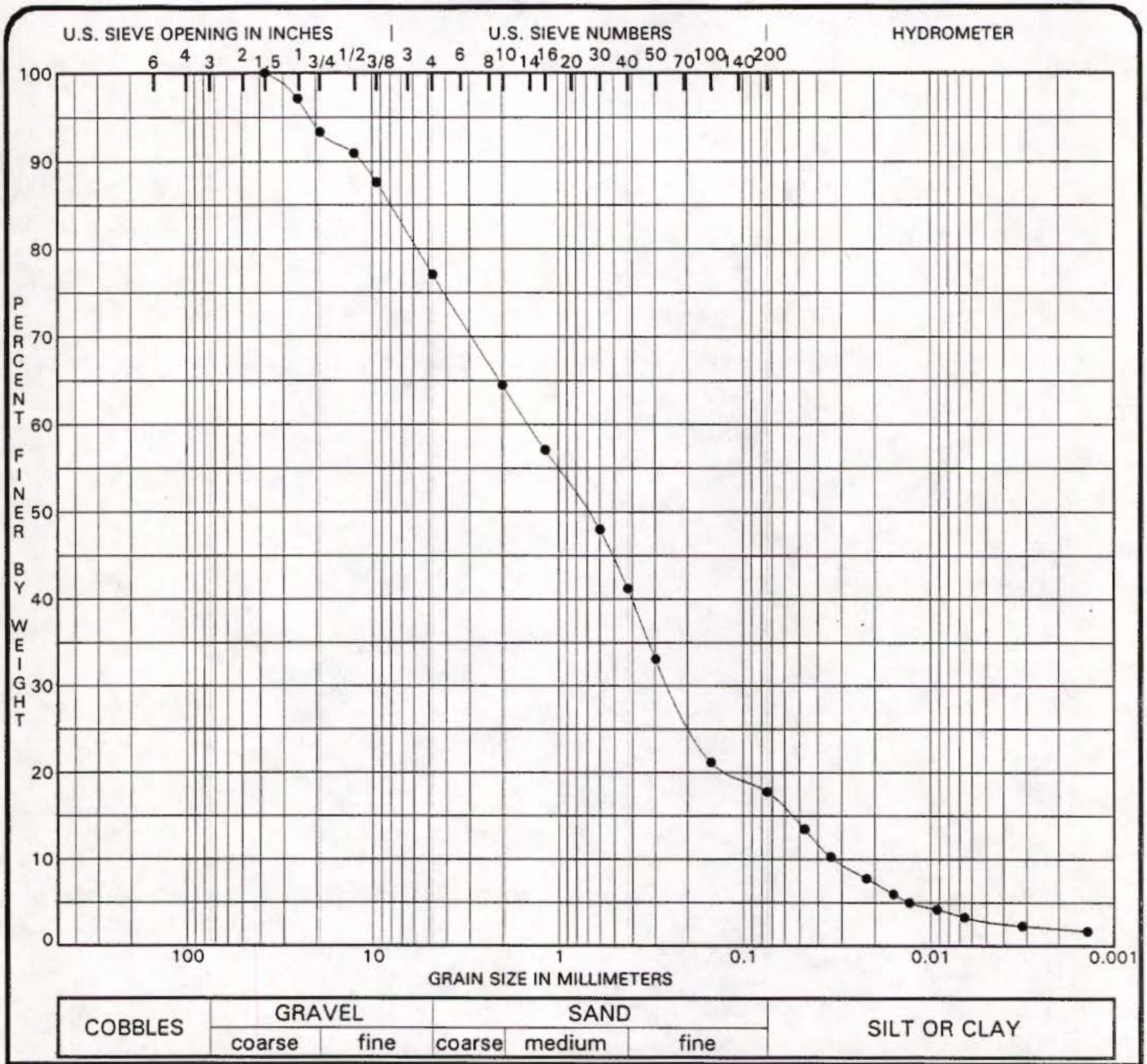


Sample Identification	USCS Classification	MC%	LL	PL	PI	Cc	Cu
● MW-32 GRAB 6'-8'	SM, Silty Sand (visual)	--					

% Gravel (>4.75mm)	% Sand (4.75 to .075mm)	% Silt (.075 to .005 mm)	% Clay (<.005mm)
22.9	59.3	14.9	2.9

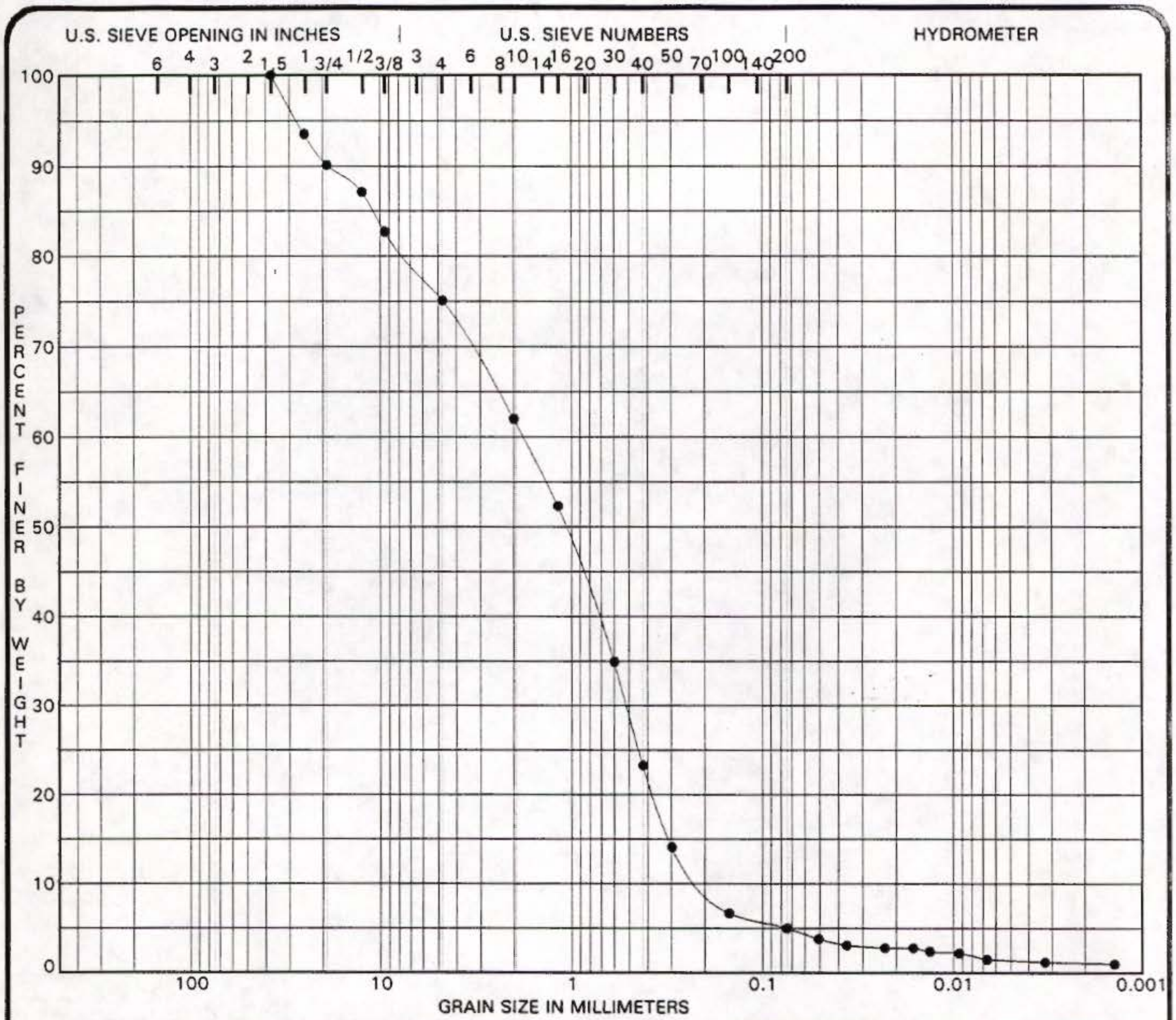
Grain Size (mm)	% Passing	Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
64.0		0.5	44.4	0.016	6.0
16.0	92.3	0.25	30.0	0.008	3.8
4.0	74.6	0.125	20.3	0.005	2.9
2.0	64.5	0.075	17.8	0.002	2.0
1.0	54.9	0.050	14.0		

PROJECT Franklin-Curtis CMS
LOCATION Franklin, Indiana
CLIENT Earth Tech
EEI PROJECT NO. 3831

CLIENT ID NO. 07026.08
DATE 4-29-96

GRAIN SIZE DISTRIBUTION CURVE

Earth Exploration, Inc.
7770 West New York Street Indianapolis, Indiana 46214
317-273-1690 / 317-273-2250 (Fax)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample Identification	USCS Classification	MC%	LL	PL	PI	Cc	Cu
● MW-32 GRAB 8'-8.8'	SP-SM, Poorly Graded Sand (visual)	--				0.73	8.8

% Gravel (>4.75mm)	% Sand (4.75 to .075mm)	% Silt (.075 to .005 mm)	% Clay (<.005mm)
24.9	70.1	3.6	1.4

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
64.0		0.5	28.8	0.016	2.8
16.0	88.9	0.25	12.2	0.008	1.9
4.0	72.5	0.125	6.3	0.005	1.4
2.0	62.0	0.075	5.0	0.002	1.1
1.0	48.0	0.050	3.7		

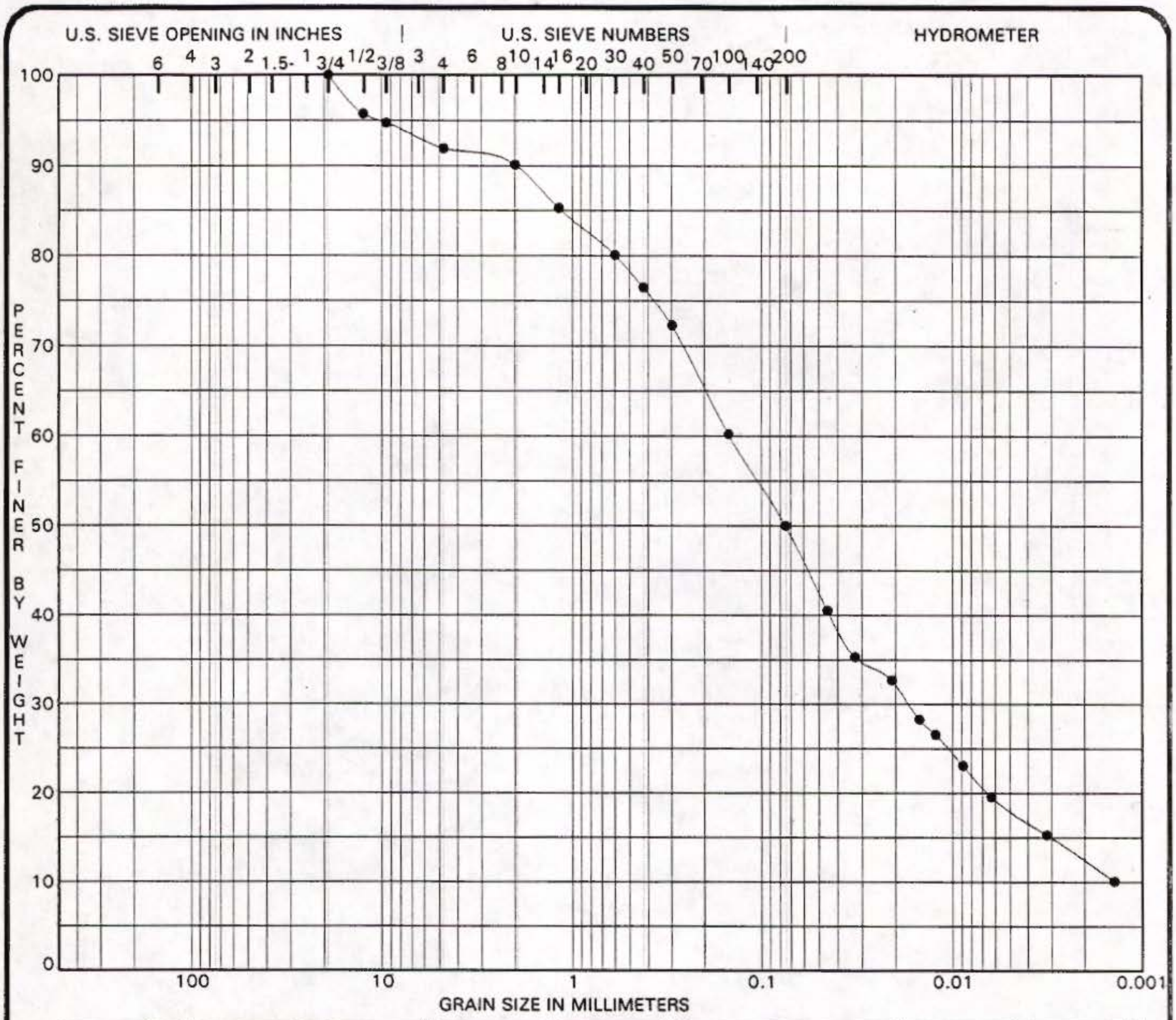
EARTH EXPLORATION Inc

PROJECT Franklin-Curtis CMS
LOCATION Franklin, Indiana
CLIENT Earth Tech
EEI PROJECT NO. 3831

CLIENT ID NO. 07026.08
DATE 4-29-96

GRAIN SIZE DISTRIBUTION CURVE

Earth Exploration, Inc.
7770 West New York Street Indianapolis, Indiana 46214
317-273-1690 / 317-273-2250 (Fax)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample Identification	USCS Classification	MC%	LL	PL	PI	Cc	Cu
● MW-32 S-1 10'-10.5'	CL-ML, Sandy Lean Clay (visual)	--					

% Gravel (>4.75mm)	% Sand (4.75 to .075mm)	% Silt (.075 to .005 mm)	% Clay (<.005mm)
8.1	41.9	31.9	18.1

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
64.0		0.5	78.2	0.016	29.1
16.0	98.2	0.25	69.1	0.008	22.0
4.0	91.5	0.125	57.5	0.005	18.1
2.0	90.1	0.075	50.0	0.002	12.3
1.0	84.0	0.050	42.3		

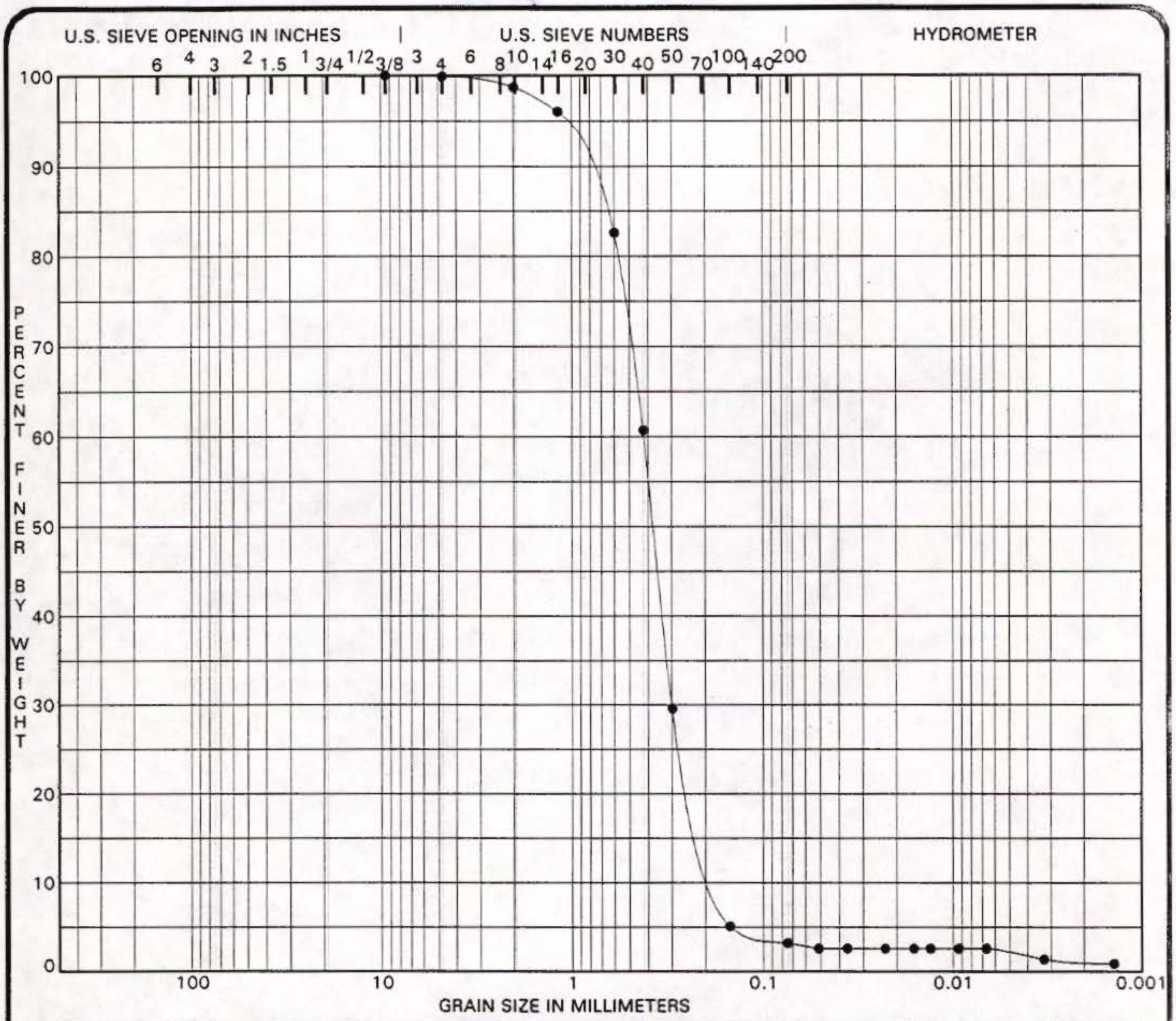
EARTH EXPLORATION Inc

PROJECT Franklin-Curtis CMS
LOCATION Franklin, Indiana
CLIENT Earth Tech
EEI PROJECT NO. 3831

CLIENT ID NO. 07026.08
DATE 4-29-96

GRAIN SIZE DISTRIBUTION CURVE

Earth Exploration, Inc.
7770 West New York Street Indianapolis, Indiana 46214
317-273-1690 / 317-273-2250 (Fax)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample Identification	USCS Classification	MC%	LL	PL	PI	Cc	Cu
●	MW-33 GRAB 8'-8.5'	SP, Poorly Graded Sand (visual)	--				1.25	2.4

% Gravel (>4.75mm)	% Sand (4.75 to .075mm)	% Silt (.075 to .005 mm)	% Clay (<.005mm)
0.1	96.7	1.1	2.1

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
64.0		0.5	71.0	0.016	2.6
16.0	100.0	0.25	23.2	0.008	2.6
4.0	99.7	0.125	4.6	0.005	2.1
2.0	98.7	0.075	3.2	0.002	1.1
1.0	92.7	0.050	2.6		

Earth Exploration Inc

PROJECT Franklin-Curtis CMS
LOCATION Franklin, Indiana
CLIENT Earth Tech
EEI PROJECT NO. 3831

CLIENT ID NO. 07026.08
DATE 4-29-96

GRAIN SIZE DISTRIBUTION CURVE

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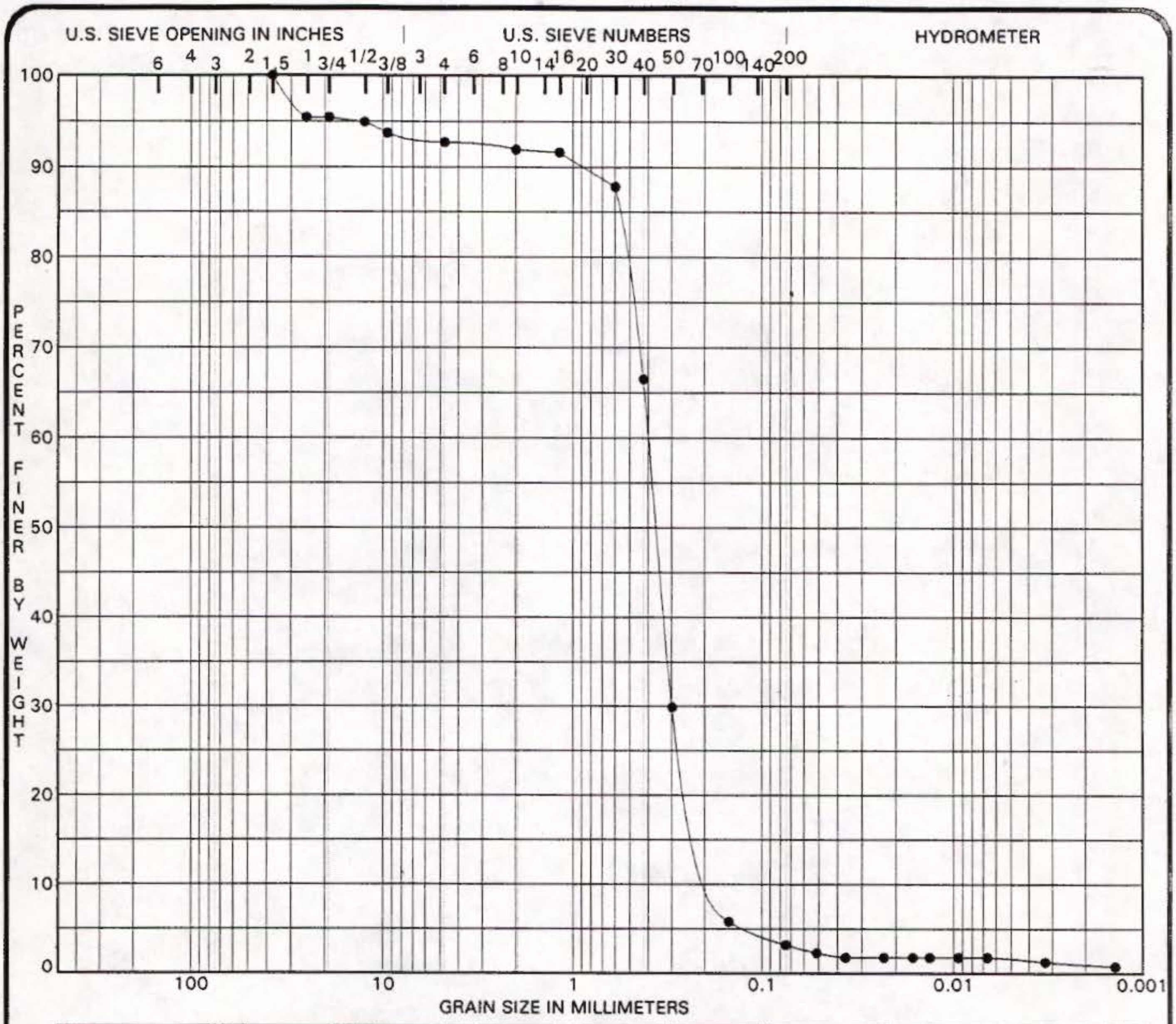

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample Identification	USCS Classification	MC%	LL	PL	PI	Cc	Cu
● MW-33 GRAB 8.5'-9'	SP, Poorly Graded Sand (visual)	--				1.33	2.4

% Gravel (>4.75mm)	% Sand (4.75 to .075mm)	% Silt (.075 to .005 mm)	% Clay (<.005mm)
7.3	89.5	1.6	1.6

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
64.0		0.5	76.5	0.016	1.8
16.0	95.2	0.25	23.6	0.008	1.8
4.0	92.5	0.125	5.1	0.005	1.6
2.0	91.9	0.075	3.2	0.002	1.0
1.0	90.7	0.050	2.3		

EARTH EXPLORATION Inc

PROJECT Franklin-Curtis CMS
LOCATION Franklin, Indiana
CLIENT Earth Tech
EEI PROJECT NO. 3831

CLIENT ID NO. 07026.08
DATE 4-29-96

GRAIN SIZE DISTRIBUTION CURVE

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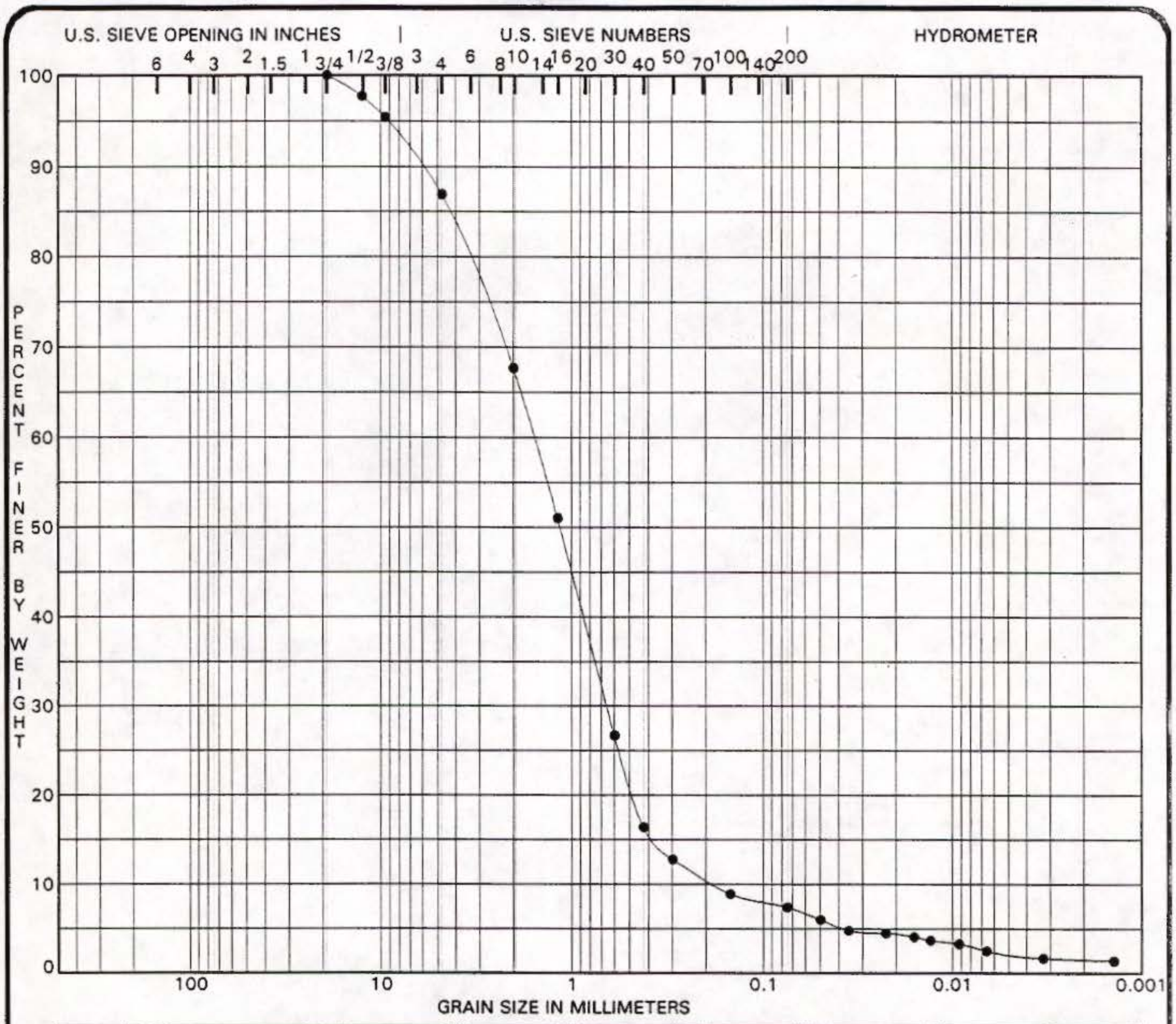

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample Identification	USCS Classification	MC%	LL	PL	PI	Cc	Cu
●	MW-34 GRAB 6'-8'	SW-SM, Well Graded Sand (visual)	--				1.51	8.6

% Gravel (>4.75mm)	% Sand (4.75 to .075mm)	% Silt (.075 to .005 mm)	% Clay (<.005mm)
13.1	79.5	5.2	2.2

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
64.0		0.5	21.3	0.016	4.1
16.0	99.1	0.25	11.8	0.008	2.9
4.0	83.1	0.125	8.5	0.005	2.2
2.0	67.7	0.075	7.4	0.002	1.5
1.0	45.1	0.050	6.0		

EARTH EXPLORATION

PROJECT Franklin-Curtis CMS
LOCATION Franklin, Indiana
CLIENT Earth Tech
EEI PROJECT NO. 3831

CLIENT ID NO. 07026.08
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GRAIN SIZE DISTRIBUTION CURVE

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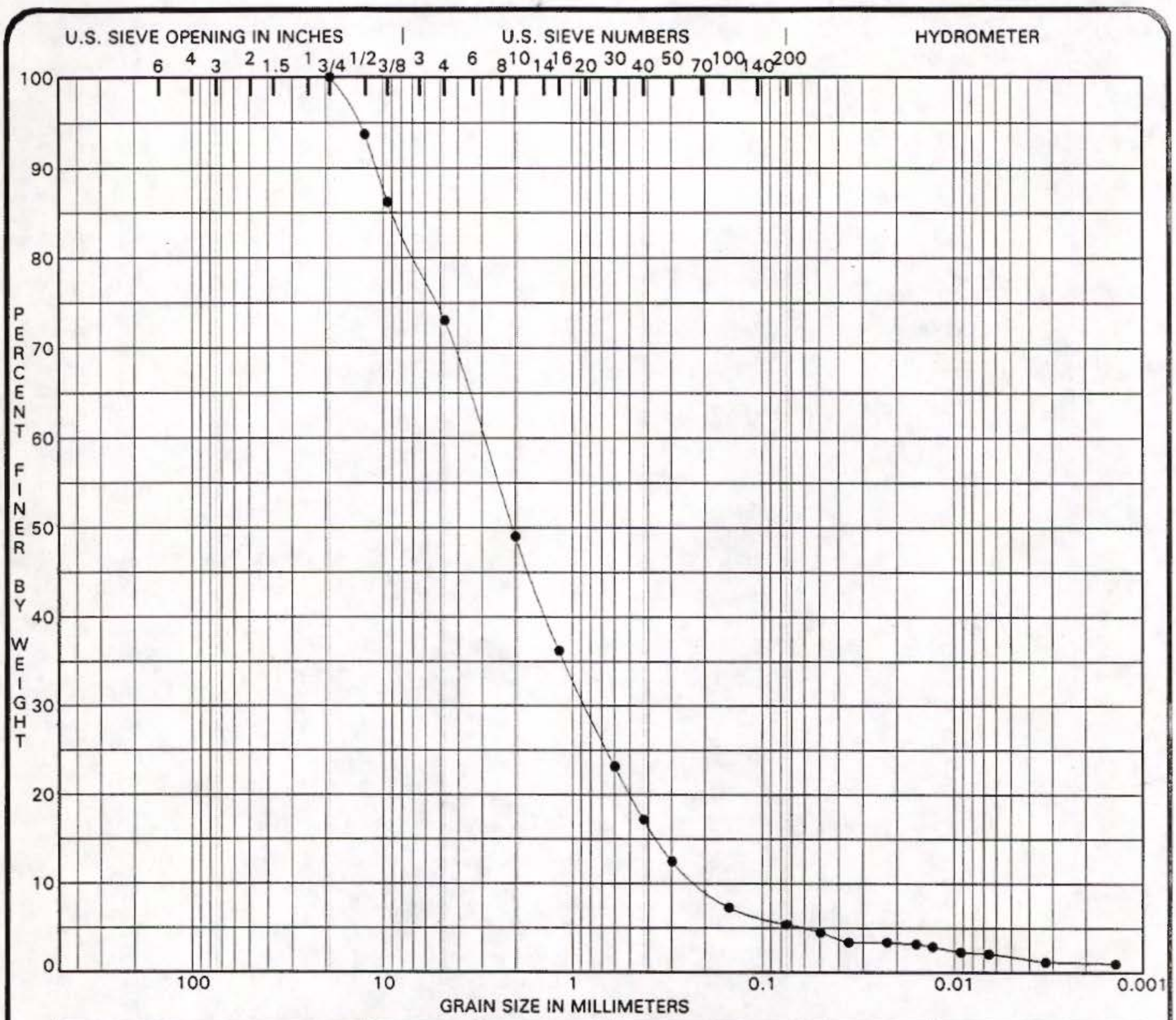

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample Identification	USCS Classification	MC%	LL	PL	PI	Cc	Cu
● MW-34 GRAB 12.5'-13'	SW-SM, Well Graded Sand (visual)	--				1.14	13.8

% Gravel (>4.75mm)	% Sand (4.75 to .075mm)	% Silt (.075 to .005 mm)	% Clay (<.005mm)
26.9	67.7	3.7	1.7

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
64.0		0.5	20.0	0.016	3.2
16.0	97.4	0.25	11.1	0.008	2.2
4.0	68.3	0.125	6.8	0.005	1.7
2.0	49.0	0.075	5.4	0.002	1.1
1.0	33.0	0.050	4.5		

EARTH EXPLORATION Inc

PROJECT Franklin-Curtis CMS
LOCATION Franklin, Indiana
CLIENT Earth Tech
EEI PROJECT NO. 3831

CLIENT ID NO. 07026.08
DATE 4-29-96

GRAIN SIZE DISTRIBUTION CURVE

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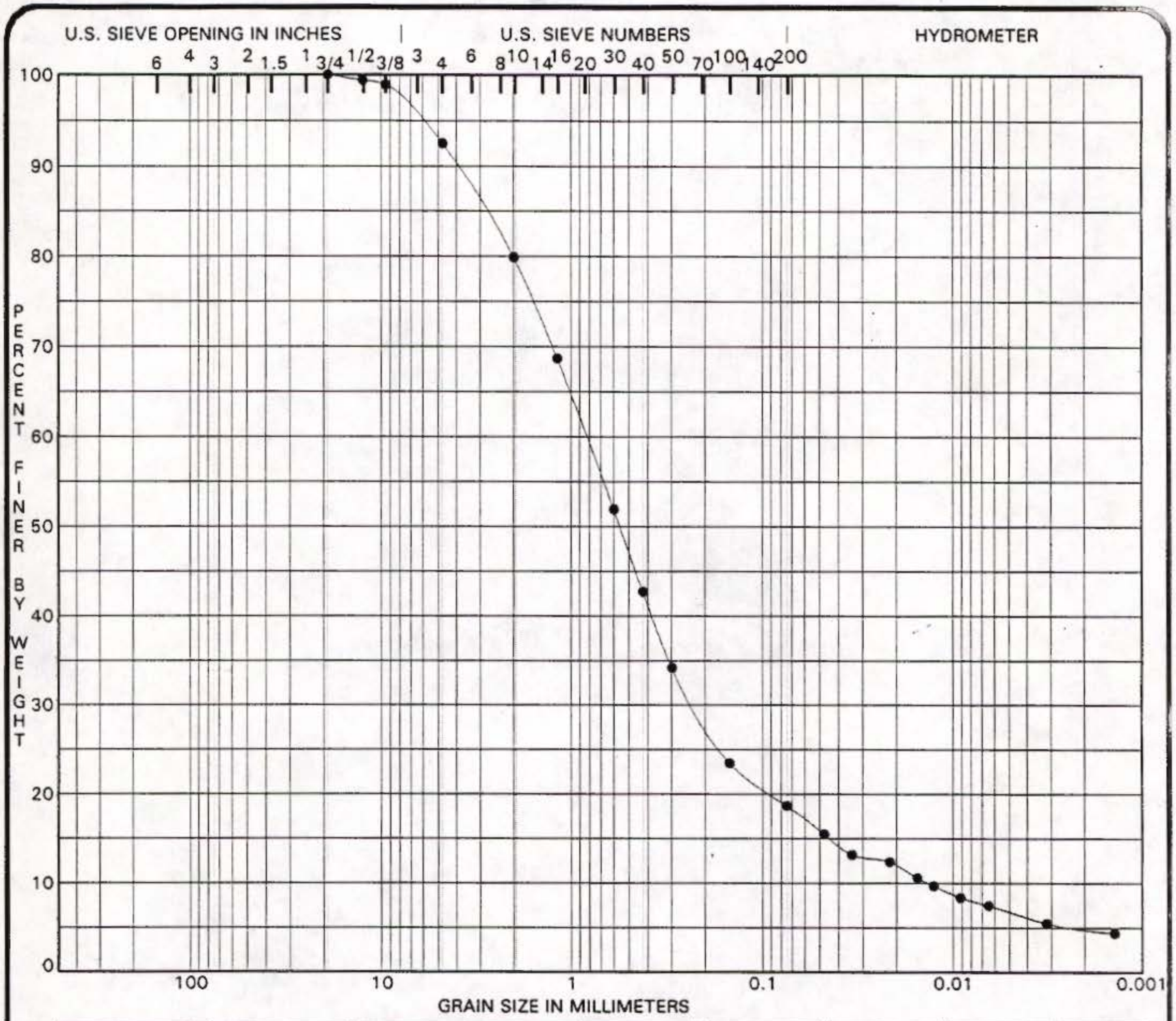


COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample Identification	USCS Classification	MC%	LL	PL	PI	Cc	Cu
● SB-1 GRAB 3'-3.5'	SM, Silty Sand (visual)	--					

% Gravel (>4.75mm)	% Sand (4.75 to .075mm)	% Silt (.075 to .005 mm)	% Clay (<.005mm)
7.5	73.8	11.9	6.8

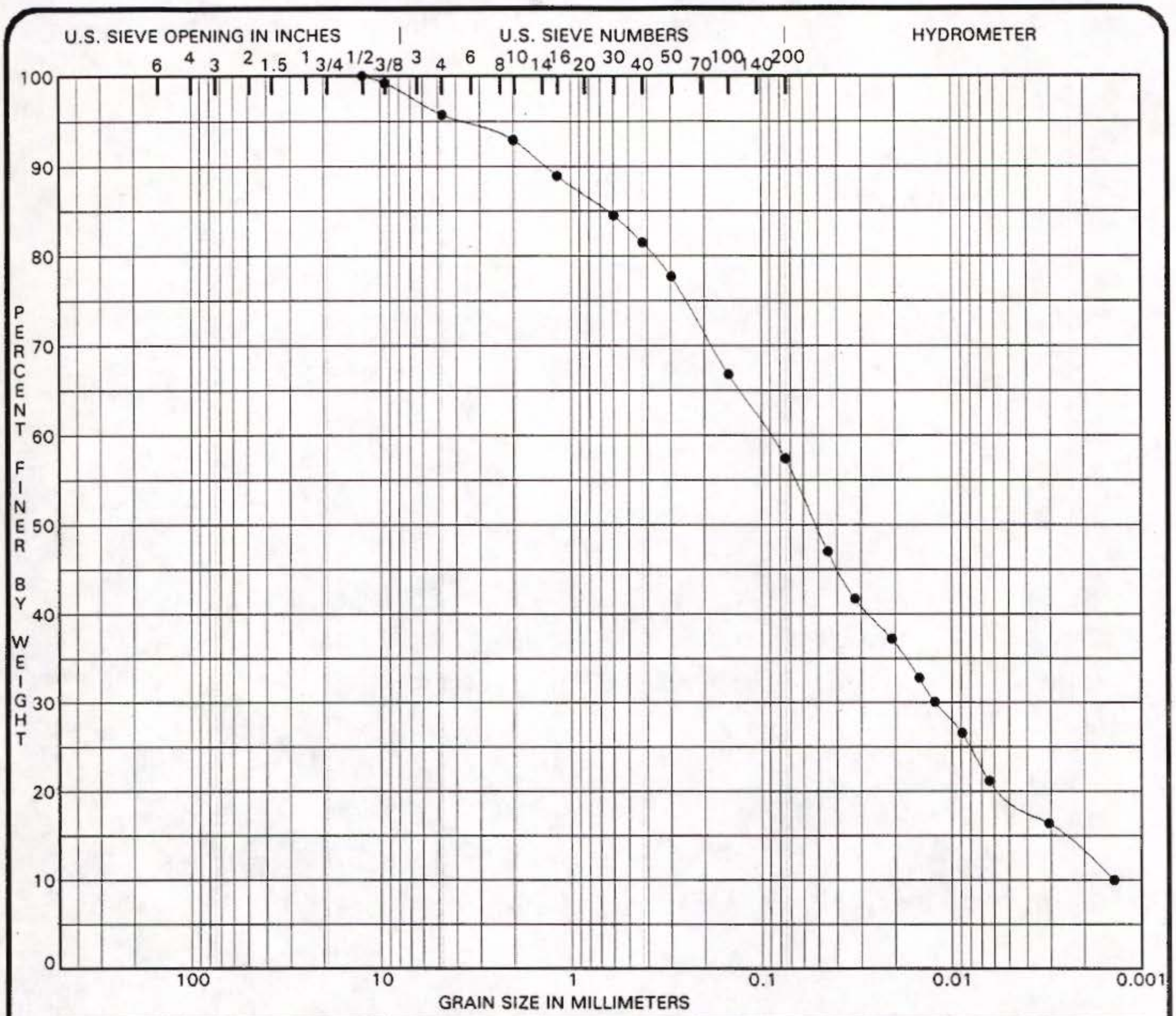
Grain Size (mm)	% Passing	Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
64.0		0.5	47.0	0.016	10.7
16.0	99.8	0.25	31.4	0.008	8.0
4.0	90.0	0.125	22.2	0.005	6.8
2.0	79.9	0.075	18.7	0.002	4.9
1.0	64.6	0.050	15.8		

PROJECT Franklin-Curtis CMS
LOCATION Franklin, Indiana
CLIENT Earth Tech
EEI PROJECT NO. 3831

CLIENT ID NO. 07026.08
DATE 4-29-96

GRAIN SIZE DISTRIBUTION CURVE

Earth Exploration, Inc.
7770 West New York Street Indianapolis, Indiana 46214
317-273-1690 / 317-273-2250 (Fax)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample Identification	USCS Classification	MC%	LL	PL	PI	Cc	Cu
● SB-1 S-1 5'-5.5'	CL-ML, Sandy Lean Clay (visual)	10.6					

% Gravel (>4.75mm)	% Sand (4.75 to .075mm)	% Silt (.075 to .005 mm)	% Clay (<.005mm)
4.3	38.3	37.8	19.6

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
64.0		0.5	82.9	0.016	33.7
16.0	100.0	0.25	74.8	0.008	24.9
4.0	95.1	0.125	64.3	0.005	19.6
2.0	92.9	0.075	57.4	0.002	12.9
1.0	87.8	0.050	49.2		

EARTH EXPLORATION INC

PROJECT Franklin-Curtis CMS
LOCATION Franklin, Indiana
CLIENT Earth Tech
EEI PROJECT NO. 3831

CLIENT ID NO. 07026.08
DATE 4-29-96

GRAIN SIZE DISTRIBUTION CURVE

Earth Exploration, Inc.
7770 West New York Street Indianapolis, Indiana 46214
317-273-1690 / 317-273-2250 (Fax)

CHAIN OF CUSTODY RECORD

Earth Tech
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812) 336-0972 Fax (812) 336-3991

PROJECT: Amphenol - Franklin Curtis - CMS

PROJECT NO.: 07026.08

SAMPLERS: Robert W. Conway

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO CONTAINERS	1L Plastic / HNO3	1L PLASTIC / NaOH	1L PLASTIC / None	2L Amber Glass / NaOH		ANALYSIS
CMS-GW-MW-34	4-9-96	16:39	WTR			MW-34	3	X	X	X			Metals (includes Ca, Mg, Mn, Fe), CN, Hardness, Alkalinity, TDS, TSS
CMS-GW-MW-34d	4-9-96	16:39	WTR			MW-34	2	X	X				Metals (includes Ca, Mg, Mn, Fe), CN
CMS-GW-MW-32	4-9-96	12:35	WTR			MW-32	1				X		Cyanide
CMS-GW-MW-33	↓	14:18	↓			MW-33	1				X		↓
CMS-GW-MW-34	↓	16:39	↓			MW-34	1				X		↓
CMS-GW-MW-31	↓	19:00	↓			MW-31	1				X		↓

Relinquished By	Date	Time	Received By	Date	Time	Remarks
Robert W. Conway	4-11-96	16:30	Fed Ex. Shipped w/COC Seal	4-11-96	16:30	
Relinquished By	**Date**	**Time**	**Received For Lab By**	**Date**	**Time**	
				4/12/96	0930	6°C

*MATRIX WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

Earth Tech
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812) 336-0972 Fax (812) 336-3991

PROJECT: AmPHENOL - FRANKLIN Curtis - CMS

PROJECT NO.: 07026.08

SAMPLERS: Robert W. Conway

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	1L Plastic / HNO_3	1L Plastic / NaOH	1L Plastic / None			ANALYSIS
CMS-GW-MW-32	4-9-96	12:35	WTR			MW-32	3	X	X	X			Metals (includes Ca, Mg,
CMS-GW-MW-33	↓	14:18	↓			MW-33	3	X	X	X			Mn, Fe) CN, Hardness,
CMS-GW-MW-31	↓	19:00	↓			MW-31	3	X	X	X			Alkalinity, TDS, TSS
CMS-GW-EB	4-9-96	17:50	WTR			—	2	X	X				Metals (includes Ca, Mg, Mn,
													Fe), CN

Relinquished By	Date	Time	Received By	Date	Time	Remarks
Robert W. Conway	4-11-96	16:30	Shipped FedEx w/COC	4-11-96	16:30	
Relinquished By	**Date**	**Time**	**Received For Lab By**	**Date**	**Time**	
				4/12/96	0930	5°C

*MATRIX: WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

CHAIN OF CUSTODY RECORD

Earth Tech
5010 Stone Mill Road, Bloomington, Indiana 47408
Phone (812) 336-0972 Fax (812) 336-3991

PROJECT: AMPHENOL-FRANKLIN Curtis-CMS
PROJECT NO. 07026.08
SAMPLERS: Robert W. Conway

SAMPLE I.D.	DATE	TIME	MATRIX*	COMP	GRAB	SAMPLE LOCATION	NO. CONTAINERS	CONTAINER TYPE/ PRESERVATIVE 40 ml Vial / HCL					ANALYSIS
CMS-GW-MW-32	4-9-96	12:35	WTR			mw-32	2	X					VOC
CMS-GW-MW-33		14:18				mw-33	2	X					
CMS-GW-MW-34		16:39				MW-34	2	X					
CMS-GW-MW-31		19:00				mw-31	2	X					
CMS-GW-MW-12		20:35				mw-12	2	X					
CMS-GW-MW-34d		16:39				mw-34d	2	X					
CMS-GW-mw-34 ms/msd		16:39				MW-34	2	X					
CMS-GW-mw-31 ms/msd		19:00				mw-31	2	X					
CMS-GW-EB		17:50				—	2	X					VOC

Relinquished By	Date	Time	Received By	Date	Time	Remarks
Robert W. Conway	4-11-96	16:30	Fed Ex Shipped w/COC seal	4-11-96	16:30	
Relinquished By	**Date**	**Time**	**Received For Lab By**	**Date**	**Time**	
			M. McCord	4/12/96	0935	5°C

*MATRIX WATER (WTR), WASTEWATER (WW), SOIL, SLUDGE (SLU), AIR, OIL, HAZARDOUS WASTE (HW)

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. ALBANY SUITE C BROKEN ARROW, OK 74012-1421 (918) 251-2858

Client Name: THE EARTH TECHNOLOGY CORPORATION
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408

Client ID: CMS-GW-MW-31 Project ID: FRANKLIN SITE

SWLO ID: 25242.02 Report: 25242.02

Collected: 04/09/1996 Report Date: 05/06/1996 Page: 1
Received: 04/12/1996 Last Modified: 05/06/1996 Matrix: Water

TEST	DATE EXTRACTED	DETECTION LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
		*** INORGANICS ***				
ALKALINITY		20	mg/l	285	04/22/96	SM 403/EPA 310.1
AMENABLE CN	04/23/96	10.0	ug/l	ND	04/23/96	SM 412F/SW 9010
HARDNESS		1	mg/l	380	05/01/96	SM 314B/EPA 130.2
TDS		10	mg/l	492	04/12/96	EPA 160.1
TSS		10	mg/l	11	04/12/96	EPA 160.2

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

dology: SM = STANDARD METHODS, 16th EDITION, 1985
EPA = #EPA600/4-79-020, MARCH 1985
SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, NOVEMBER 1986

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. ALBANY SUITE C BROKEN ARROW, OK 74012-1421 (918) 251-2858

Client Name: THE EARTH TECHNOLOGY CORPORATION
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408

Client ID:	CMS-GW-MW-32	Project ID:	FRANKLIN SITE
SWLO ID:	25242.05	Report:	25242.05

Collected: 04/09/1996 Report Date: 05/06/1996 Page: 1
Received: 04/12/1996 Last Modified: 05/06/1996 Matrix: Water

TEST	DATE EXTRACTED	DETECTION LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
		*** INORGANICS ***				
ALKALINITY		20	mg/l	269	04/22/96	SM 403/EPA 310.1
AMENABLE CN	04/23/96	10.0	ug/l	ND	04/23/96	SM 412F/SW 9010
HARDNESS		1	mg/l	332	05/01/96	SM 314B/EPA 130.2
TDS		10	mg/l	395	04/12/96	EPA 160.1
TSS		10	mg/l	ND	04/12/96	EPA 160.2

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

dology: SM = STANDARD METHODS, 16th EDITION, 1985
EPA = #EPA600/4-79-020, MARCH 1985

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, NOVEMBER 1986

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. ALBANY SUITE C BROKEN ARROW, OK 74012-1421 (918) 251-2858

Client Name: THE EARTH TECHNOLOGY CORPORATION
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408

Client ID: CMS-GW-MW-33 Project ID: FRANKLIN SITE

SWLO ID: 25242.06 Report: 25242.06

Collected: 04/09/1996 Report Date: 05/06/1996 Page: 1
Received: 04/12/1996 Last Modified: 05/06/1996 Matrix: Water

TEST	DATE EXTRACTED	DETECTION LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
		*** INORGANICS ***				
ALKALINITY		20	mg/l	290	04/22/96	SM 403/EPA 310.1
AMENABLE CN	04/23/96	10.0	ug/l	ND	04/23/96	SM 412F/SW 9010
HARDNESS		1	mg/l	362	05/01/96	SM 314B/EPA 130.2
TDS		10	mg/l	428	04/12/96	EPA 160.1
TSS		10	mg/l	26	04/12/96	EPA 160.2

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
odology: SM = STANDARD METHODS, 16th EDITION, 1985
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, NOVEMBER 1986

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. ALBANY SUITE C BROKEN ARROW, OK 74012-1421 (918) 251-2858

Client Name: THE EARTH TECHNOLOGY CORPORATION
5010 STONE MILL ROAD
BLOOMINGTON, IN 47408

Client ID: CMS-GW-MW-34 Project ID: FRANKLIN SITE

SWLO ID: 25242.07 Report: 25242.07

Collected: 04/09/1996 Report Date: 05/06/1996 Page: 1
Received: 04/12/1996 Last Modified: 05/06/1996 Matrix: Water

TEST	DATE EXTRACTED	DETECTION LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
		*** INORGANICS ***				
ALKALINITY		20	mg/l	263	04/22/96	SM 403/EPA 310.1
AMENABLE CN	04/23/96	10.0	ug/l	ND	04/23/96	SM 412F/SW 9010
HARDNESS		1	mg/l	325	05/01/96	SM 314B/EPA 130.2
TDS		10	mg/l	399	04/12/96	EPA 160.1
TSS		10	mg/l	12	04/12/96	EPA 160.2

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

odology: SM = STANDARD METHODS, 16th EDITION, 1985
EPA = #EPA600/4-79-020, MARCH 1985

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, NOVEMBER 1986

CHAIN OF CUSTODY RECORD

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 W. Albany • Broken Arrow, Oklahoma 74012-1421
Office 918-251-2858 • Fax 918-251-2599

SAMPLING FIRM EARTH TECH	CLIENT CONTACT J. KILTI	PHONE NUMBER (812) 336-0972
P O or PROPOSAL NUMBER	PROJECT NAME FORMER AMPHENOL CMS	

SAMPLER (Signature) Martin Lytle

ANALYTICAL TESTS REQUESTED

SAMPLE ID	DATE	TIME	COMP	GRAB	LOCATION	MATRIX	NUMBER OF CONTAINERS	VOC	METALS, CN		HDol VOA	METALS/				REMARKS
MW-32	4/4/96	1330		X	6.0-8.0 FT	SOIL	2	X	X							
MW-32	|	1800		|	8.8-9.3 FT	|	2	X	X							
MW-33	|	1630		|	6.0-7.0 FT	|	2	X	X							
MW-33	↓	1610		↓	9.0-9.5 FT	↓	2	X	X							
BLANK	4/5/96	1000		X	RINSATE	WTR	3				X	X				
MW-34	|	1100		X	6.0-8.0 FT	SOIL	2	X	X							
MW-34	|	1130		|	17.0-17.5 FT	|	2	X	X							
MW-31	|	1410		|	6.0-8.0 FT	|	2	X	X							
MW-31	|	1410		|	6.0-8.0 FT Dup	|	2	X	X							
MW-31	|	1410		|	6.0-8.0 FT MS	|	1	X								
MW-31	|	1410		|	6.0-8.0 FT MSD	|	1	X								
MW-31	↓	1440		↓	14.0-15.0 FT	↓	2	X	X							

RELINQUISHED BY (Signature)	DATE	TIME	RECEIVED BY (Signature)	RELINQUISHED BY (Signature)	DATE	TIME	RECEIVED BY (Signature)
Martin Lytle	4/5/96	1700	Custody Seal				

RELINQUISHED BY (Signature)	DATE	TIME	RECEIVED BY (Signature)	RELINQUISHED BY (Signature)	DATE	TIME	RECEIVED FOR LABORATORY BY (Signature)
					4/6/96	0840	

RELINQUISHED BY (Signature)	DATE	TIME	RECEIVED BY (Signature)	REMARKS
				ATTN: RANDY STAGGS 5°C

SE2000			
Environmental Logger			
4/22/96 10:36			
Unit# CHROME_L Test 0			
Setups:	INPUT 1	INPUT 2	INPUT 3
------------	---------	---------	---------
Type	Level (F)	Level (F)	Level (F)
Mode	TOC	TOC	TOC
I.D.	P1	MW31	P2
Reference	727.980	727.660	727.140
SG	1.000	1.000	1.000
Linearity	0.000	0.000	0.026
Scale factor	10.000	10.096	10.100
Offset	0.000	0.210	0.123
Delay mSEC	50.000	50.000	50.000
Step 0 04/18 10:37:50			
Elapsed Time	INPUT 1	INPUT 2	INPUT 3
------------	---------	---------	---------
0.000	725.927	726.325	726.289

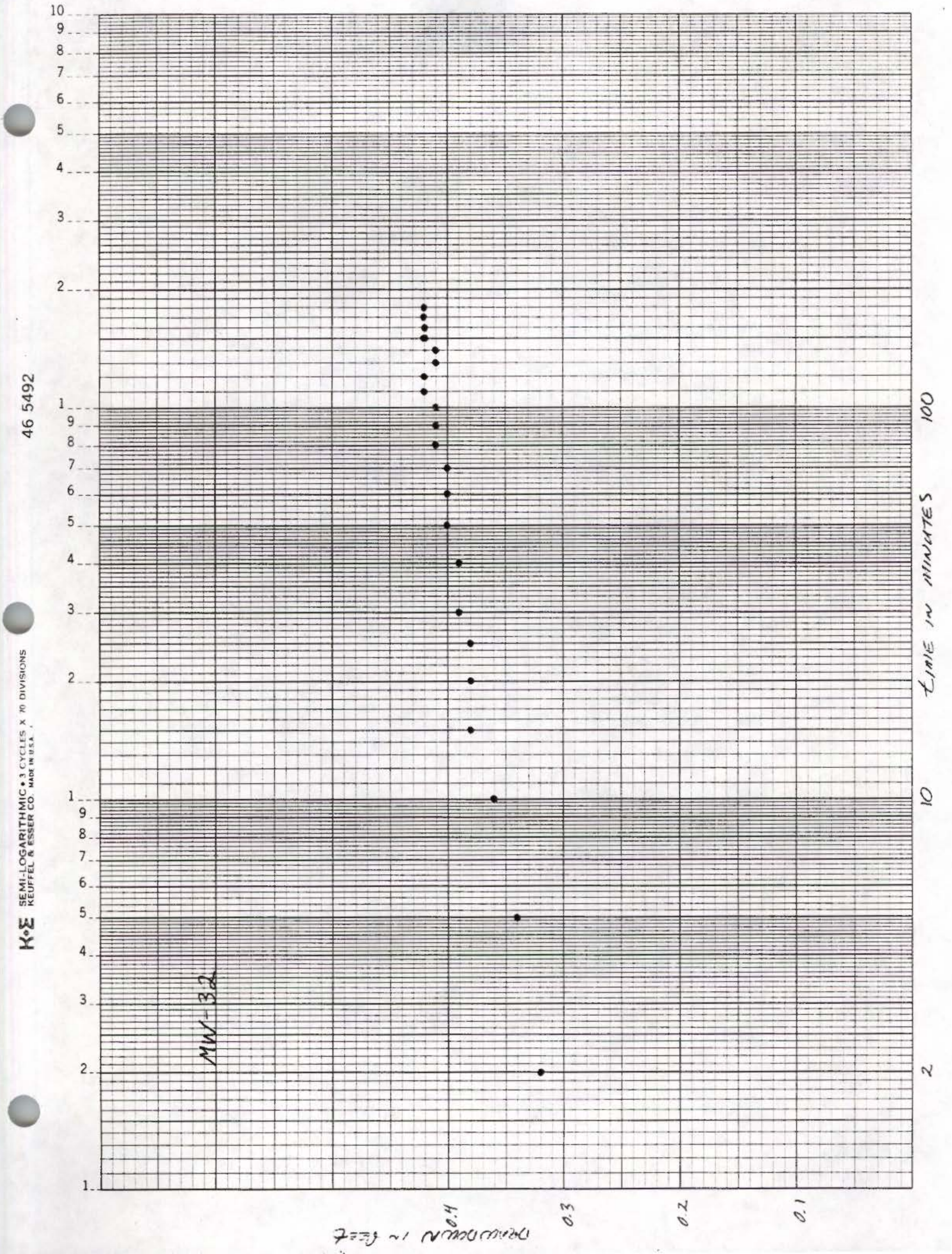
SE2000			
Environmental Logger			
4/22/96 10:41			
Unit# CHROME_L Test 1			
Setups:	INPUT 1	INPUT 2	INPUT 3
------------	---------	---------	---------
Type	Level (F)	Level (F)	Level (F)
Mode	TOC	TOC	TOC
I.D.	P1	MW31	P2
Reference	727.980	727.660	0.000
SG	1.000	1.000	1.000
Linearity	0.000	0.000	0.000
Scale factor	10.000	10.096	16.000
Offset	0.000	0.210	4.000
Delay mSEC	50.000	50.000	50.000
Step 0 04/18 11:49:01			
Elapsed Time	INPUT 1	INPUT 2	INPUT 3
------------	---------	---------	---------
0.000	725.939	726.331	-3.680
10.000	725.946	728.049	-3.715
20.000	725.955	728.059	-3.740
30.000	725.939	728.046	-3.806
40.000	725.943	728.040	-3.857
50.000	725.952	727.889	-3.872
60.000	725.952	728.049	-3.933
70.000	725.962	728.059	-3.968

SE2000			
Environmental Logger			
4/22/96 10:46			
Unit# CHROME_L Test 2			
Setups:	INPUT 1	INPUT 2	INPUT 3
------------	---------	---------	---------
Type	Level (F)	Level (F)	Level (F)
Mode	TOC	TOC	TOC
I.D.	P1	MW31	P2
Reference	727.980	727.660	727.140
SG	1.000	1.000	1.000
Linearity	0.000	0.000	0.026
Scale factor	10.000	10.096	10.100
Offset	0.000	0.210	0.123
Delay mSEC	50.000	50.000	50.000
Step 0 04/18 13:37:47			
Elapsed Time	INPUT 1	INPUT 2	INPUT 3
------------	---------	---------	---------
0.000	725.958	726.337	727.085
10.000	725.958	728.052	727.085
20.000	725.962	728.052	727.072

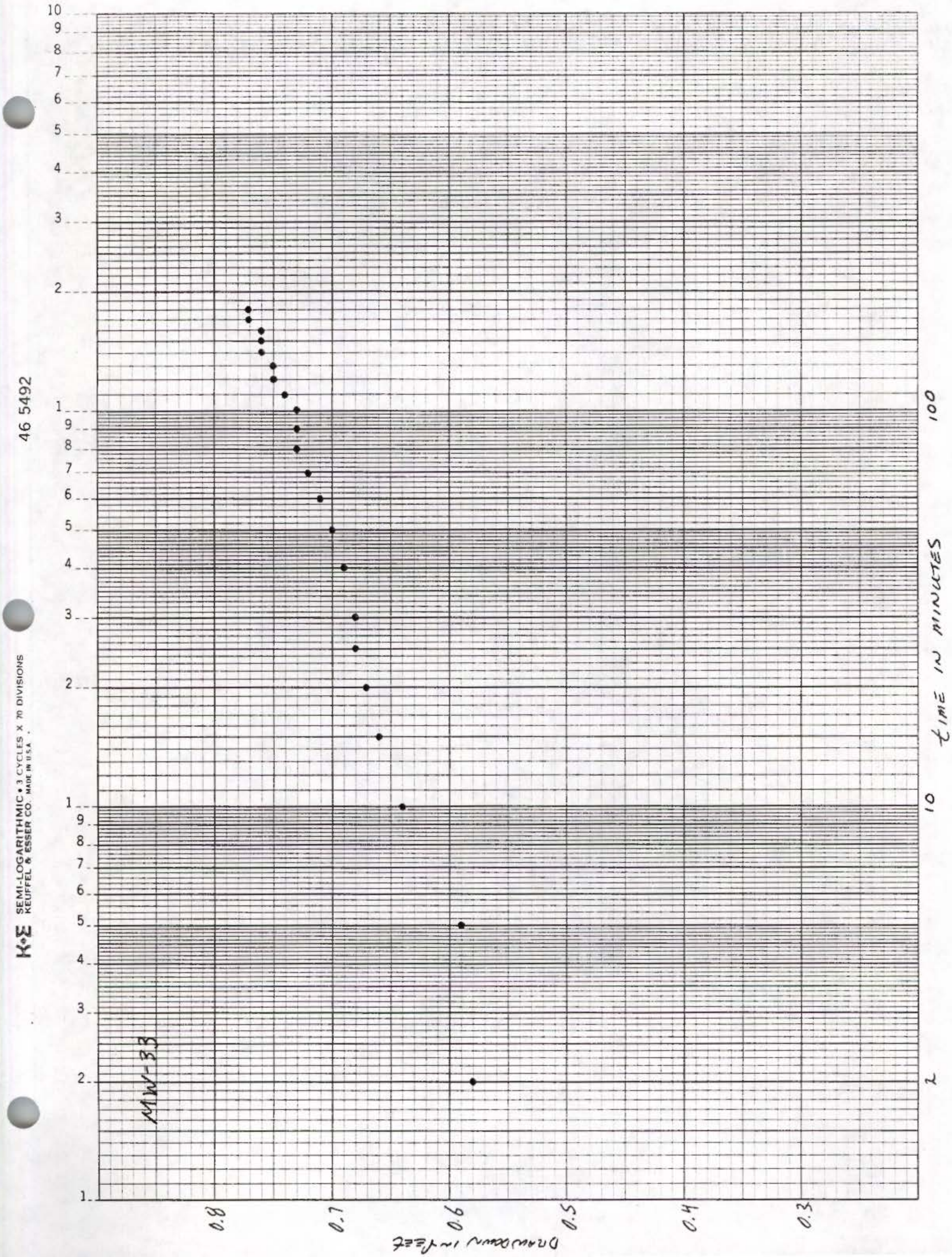
SE2000		
Environmental Logger		
4/22/96 10:43		
Unit# CHROME_L Test 3		
Setups:	INPUT 1	INPUT 2
------------	---------	---------
Type	Level (F)	Level (F)
Mode	TOC	TOC
I.D.	P1	P2
Reference	8.970	8.190
SG	1.000	1.000
Linearity	0.000	0.000
Scale factor	10.000	10.096
Offset	0.000	0.210
Delay mSEC	50.000	50.000
Step 0 04/19 08:55:15		
Elapsed Time	INPUT 1	INPUT 2
------------	---------	---------
0.000	8.922	8.183
10.000	8.941	8.202
20.000	8.951	8.212
30.000	8.960	8.218
40.000	8.963	8.221
50.000	8.960	8.221
60.000	8.970	8.228
70.000	8.970	8.228
80.000	8.966	8.221
90.000	8.976	8.231
100.000	8.966	8.221
110.000	8.944	8.218
120.000	8.973	8.228
130.000	8.982	8.241
140.000	8.957	8.215
150.000	8.970	8.228
160.000	8.970	8.234
170.000	8.979	8.234
180.000	8.979	8.241

SE2000		
Environmental Logger		
4/22/96 10:48		
Unit# CHROME_L Test 4		
Setups:	INPUT 1	INPUT 2
------------	---------	---------
Type	Level (F)	Level (F)
Mode	TOC	TOC
I.D.	P1	P2
Reference	8.985	8.205
SG	1.000	1.000
Linearity	0.000	0.000
Scale factor	10.000	10.096
Offset	0.000	0.210
Delay mSEC	50.000	50.000
Step 0 4/19/1996 12:00:00 PM		
Elapsed Time	INPUT 1	INPUT 2
------------	---------	---------
0.000	8.959	8.192
10.000	8.956	8.220
20.000	8.956	8.224
30.000	8.950	8.214
40.000	8.962	8.224
50.000	8.966	8.233
60.000	8.966	8.224
70.000	8.959	8.227
80.000	8.969	8.233
90.000	8.972	8.233
100.000	8.956	8.217
110.000	8.934	8.211

SE2000		
Envoronmental Logger		
4/22/96 10:50		
Unit# CHROME_L Test 4		
Setups:	INPUT 1	INPUT 2
------------	---------	---------
Type	Level (F)	Level (F)
Mode	TOC	TOC
I.D.	P1	P2
Reference	8.985	8.205
SG	1.000	1.000
Linearity	0.000	0.000
Scale factor	10.000	10.096
Offset	0.000	0.210
Delay mSEC	50.000	50.000
Step 1 4/19/1996 2:00:00 PM		
Elapsed Time	INPUT 1	INPUT 2
------------	---------	---------
0.000	9.019	8.230
10.000	9.000	8.211



K+E SEMI-LOGARITHMIC • 3 CYCLES X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.
46 5492
MW-32
TIME IN MINUTES
2
10
100
DRAWDOWN IN FEET
0.4
0.3
0.2
0.1



MW-33
TIME IN MINUTES
2
10
100
DRAWDOWN IN FEET
0.8
0.7
0.6
0.5
0.4
0.3
46 5492
K+E SEMI-LOGARITHMIC • 3 CYCLES X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

Appendix D.
Non-CLP Ground Water Data.

Sample Number	MW-31	MW-32	MW-33	MW-34
pH	6.68	6.96	6.64	6.74
Specific Conductance (umho/cm)	0.90	0.70	0.90	0.70
Temperature (° C)	10.40	9.10	8.10	10.00
Dissolved Oxygen (mg/l)	13.70	11.60	11.20	12.40
Turbidity (Ntu)	14	0	16	22
Alkalinity (mg/l	285	269	290	263
Total Hardness (mg/l)	380	332	362	325
TDS (mg/l)	492	395	428	399
TSS (mg/l)	11	<10	26	12

Amphenol Franklin Curtis RFI
Inorganic Data Validation
April 4 & 5, 1996 Soil Samples

1. Introduction

This report summarizes the validation of 9 soil samples and one rinsate blank collected for the Amphenol Franklin Curtis RFI. The samples were analyzed by the Southwest Laboratory of Broken Arrow, OK for metals and cyanide (total and amenable). Data validation was performed according to the USEPA National Functional Guidelines for Inorganic Analysis (1994) and the Project QAPP.

2. Data Package Completeness

The data package was complete and legible. The laboratory did not analyze the field duplicate for MW-31 6.0-8.0 ft. All other analyses requested were completed by the laboratory.

3. Holding Times

All samples were analyzed within the required holding times.

4. Calibration Verification Results

All calibrations were acceptable. Initial calibration verifications (ICV) and continuing calibration verifications (CCV) were analyzed at the appropriate frequency and were within the 90%-110% control limit.

5. Field and Laboratory Blanks

The calibration and preparation blanks for the rinsate sample contained low levels of barium, beryllium, copper, selenium, and thallium at the MDL. The calibration and preparation blanks for the soil samples contained low levels of antimony, cadmium, and copper at the MDL. No qualification is required since the values were too low to affect the sample data. Blanks for cyanide were negative indicating lower absorbance than the first blank analyzed. This also would not affect the quality of the data. All other laboratory blanks contained no detectable contamination.

The rinsate blank contained low levels of copper (22.1 ug/l) and zinc (28.7 ug/l). Metals at theses levels would not affect the soil data. No other elements were detected in the rinsate blank at the reporting limits..

6. ICP Interference Check Sample Results

ICP interference check samples were analyzed at the required frequency and the results were within 20% of the true value.

7. Laboratory Control Sample Results

Laboratory control samples were analyzed at the required frequency and were within the 80%-120% control limit.

8. Laboratory and Field Duplicate Results

A field duplicate was designated on the chain of custody however the laboratory did not analyze the sample. The laboratory duplicate exceeded 30% RPD for the following parameters:

Element	% RPD
Aluminum	76.9
Antimony	39.4
Barium	64.3
Cadmium	34.5
Chromium	57.8
Cobalt	63.4
Copper	98.9
Iron	104.4
Magnesium	77.7
Manganese	75.9
Nickel	46.4
Vanadium	40.9
Zinc	84.6
Cyanide	84.6

Due to the absence of a field duplicate analysis and the poor precision encountered with this sample, the results for the above metals are qualified as estimated (J) in all samples .

Duplicate precision for amenable cyanide on MW-31 6.0-8.0 ft was 200%. This was based on one BDL result (0.5 mg/kg) and the other at 0.74 mg/kg. This result was not qualified due to the proximity to the LOD.

9. Matrix Spike Recovery Results

MS/MSD samples were not designated on the chain of custody. The laboratory did not perform a MS/MSD analysis.

10. Furnace Atomic Absorption Results

Duplicate injections were performed for all furnace elements. All duplicate injections were within 20% RPD.

11. ICP Serial Dilution Results

The ICP Serial Dilutions for iron and manganese exceeded the 10% control limit on all samples. The results for these elements are qualified as estimated (J) due to matrix interference.

12. Post Digestion Spikes

The following furnace post digestion spikes exceeded the 85-115% control limit:

GW-MW-32 6.0-8.0 ft	Thallium, total	55 % R
GW-MW-32 8.8-9.3 ft	Thallium, total	47 % R
	Selenium, total	77 % R
GW-MW-33 6.0-7.0 ft	Thallium, total	49 % R
	Selenium, total	70 % R
	Arsenic, total	78 % R
GW-MW-33 9.0-9.5 ft	Thallium, total	55 % R
GW-MW-34 6.0-8.0 ft	Thallium, total	60 % R
	Selenium, total	70 % R
GW-MW-31 6.0-8.0 ft	Thallium, total	70 % R
	Selenium, total	80 % R
GW-MW-31 14-15 ft	Thallium, total	83 % R
	Selenium, total	84 % R

13. Detection Limit Results

All methods exhibited appropriate sensitivity to achieve the required detection limits.

14. Sample Results

Raw data results were compared with the final report and all values were correctly reported. Based on professional judgment, the data can be used with the qualifications outlined in Table 1.

Table 1

Amphenol Franklin Curtis RFI
Inorganic Data Validation
April 4 & 5, 1996 Soil Samples

Sample	MW-32 6.0-8.0 ft	MW-32 8.8-9.3 ft	MW-33 6.0-7.0 ft	MW-33 9.0-9.5 ft	MW-34 6.0-8.0 ft	MW-34 17.0-17.5 ft	MW-31 6.0-8.0 ft	MW-31 14.0-15.0 ft
Aluminum	1200 J	4260 J	1610 J	2410 J	1600 J	4050 J	1700 J	3530 J
Antimony	3.3 UJ	1.8 UJ	1.9 UJ	2.8 BJ	2.3 BJ	1.8 UJ	2.7 BJ	1.8 UJ
Arsenic	*	*	0.52 BJ	*	*	*	*	*
Barium	5.3 J	32.9 J	7.2 J	21.6 J	11.4 J	46.5 J	15.1 J	46.0 J
Cadmium	0.22 BJ	0.19 UJ	0.20 J	0.25 BJ	0.27 BJ	0.31 BJ	0.28 BJ	0.19 UJ
Chromium	3.2 J	6.5 J	3.5 J	5.0 J	4.1 J	7.3 J	4.6 J	6.4 J
Cobalt	1.5 BJ	4.8 J	1.8 BJ	3.7 J	3.0 J	5.0 J	2.7 J	5.0 J
Copper	5.4 J	12.7 J	7.5 J	8.0 J	9.9 J	13.5 J	15.6 J	14.7 J
Iron	3850 J	11900 J	3810 J	7790 J	9910 J	10900 J	10200 J	10500 J
Magnesium	65000 J	31600 J	20800 J	54800 J	33200 J	28700 J	39200 J	29500 J
Manganese	149 J	181 J	119 J	191 J	307 J	264 J	637 J	260 J
Nickel	2.9 BJ	18.5 J	4.9 J	5.7 J	10.7 J	13.3 J	10.3 J	13.8 J
Thallium	0.24 UJ	0.25 UJ	0.25 UJ	0.24 UJ	0.023 UJ	*	0.23 UJ	0.3 BJ
Selenium	*	0.31 UJ	0.32 UJ	*	0.29 UJ	*	0.29 UJ	0.31 UJ
Vanadium	5.7 J	10.9 J	4.7 J	8.0 J	6.8 J	10.5 J	8.1 J	9.4 J
Zinc	12.8 J	31.7 J	18.5 J	17.0 J	34.6 J	33.5 J	36.2 J	34.0 J
Cyanide	1.3 J	0.89 J	0.21 BJ	1.5 J	0.64 J	1.3 J	0.33 BJ	0.89 J

* Data point not qualified

Amphenol Franklin Curtis RFI
Volatile Organics Data Validation
April 4 & 5, 1996 Soil Samples

1. Introduction

This report summarizes the validation of 9 soil samples and one rinsate blank samples collected for the Amphenol Franklin Curtis RFI on April 4 & 5, 1996. The samples were analyzed by the Southwest Laboratory of Broken Arrow, OK for Volatile Organics. Data validation was performed according to the USEPA National Functional Guidelines for Organic Analyses (1994) and the Project QAPP..

2. Data Package Completeness and Accuracy

All forms and data necessary for validation were included in the data package.

3. Holding Times

All samples were analyzed within the two week hold time.

4. GC/MS Instrument Performance Check

BFB was analyzed at the required frequency. Mass spectra for BFB met the required ion abundances.

5. Initial Calibration

The following initial calibration standard RRFs were greater than 30% RSD:

Chloroethane	53.8% RSD
Methylene chloride	98.5% RSD
Acetone	95.6% RSD
2-Butanone	49.0% RSD
Bromoform	31.5% RSD
4-Methyl-2-pentanone	51.1% RSD
2-Hexanone	59.8% RSD
1,1,2,2-Tetrachloroethane	41.9% RSD
2-Chloroethyl vinylether	35.8% RSD

The exceeding of %RSD criteria for these compounds was caused by high RFs in the 5 ppb standard. This deviation would not affect non-detectable samples as it indicates increased sensitivity at the low end of the curve. Only acetone and methylene chloride were detected in the RFI samples. All results for these compounds are considered estimated (J).

All other initial calibration compounds were less than 30% RSD. All RRFs were greater than 0.05.

6. Continuing Calibration Check

The compounds listed in Table 1 exceed 25% RSD in the continuing calibration standard. None of the * compounds were detected in the corresponding RFI samples. Compounds with positive % RSDs do not require qualification since there was sufficient instrument sensitivity to compensate for a lower response.

All RRFs were > 0.05 in the continuing calibration check standard.

Table 1
Continuing Calibration Standard Performance Deviations

Compound	% RSD
Bromomethane*	-56.0
Methylene chloride	54.5
Acetone	43.6
2-Butanone*	38.7
Carbon tetrachloride*	-25.6
4-Methyl-2-pentanone*	40.9
2-Hexanone*	46.0
Vinyl acetate*	40.2

Acetone and methylene chloride were detected in the RFI samples. Results for these compounds are qualified as estimated (J).

7. Blanks

Instrument blanks contained methylene chloride at 4 ug/kg and 12 ug/kg. All samples containing methylene chloride at levels of 20 ug/kg (4/10/96) and 60 ug/kg (4/11/96) are qualified as estimated (JB) due to potential blank contamination. All other instrument blanks were acceptable.

The equipment blank contained 760/730 ug/l of acetone. Results for this compound are qualified as estimated due to potential field contamination. All other rinsate blank compounds were not detected.

8. System Monitoring Compounds

All surrogate recoveries were within acceptable limits.

9. MS/MSD

Trichloroethylene in sample MW 31 6.0-8.0 ft. was recovered at 15% and 86% yielding an RPD of 129%. Results of trichloroethylene in this sample are considered estimated due to matrix problems (J). The %RPD for 1,1-Dichloroethylene was 33%. Results for this compound are considered estimated (J).

All other MS/MSD compounds were within 25% RPD and 75%-125% recovery.

10. LCS

The LCS samples were analyzed at the required frequency and were within acceptable limits.

11. Internal Standards

Internal standards were within acceptable limits for all samples.

12. Detection Limits

RFI detection limits were obtained on all samples.

13. Duplicate Analysis

Field duplicates were within acceptable limits for all compounds except acetone and methylene chloride. These compounds were detected in the blank and therefore, the results are estimated (JB).

14. Data Accuracy

All quanitations were performed correctly. Mass spectra indicated proper compound identification.

15. Overall Assessment of the Data

Based on professional judgment, this data set can be used with the qualification listed on Table 2.

Table 2

Amphenol Franklin Curtis RFI
Volatile Organics Data Validation
April 4 & 5, 1996 Soil Samples

Sample	Methylene Chloride	Acetone	Trichloroethylene	1,1-Dichloroethene
MW-31 6-8 ft	8 JB	20 JB	4 J	5 UJ
MW-31 6-8 ft Dup	9 JB	9 JB	5 J	5 UJ
MW-31 14-15 ft	21 JB	20 JB	*	*
MW-32 6-8 ft	7 JB	6 JB	*	*
MW-32 8.8-9.3 ft	10 JB	20 JB	*	*
MW-33 6-7 ft	8 JB	12 JB	*	*
MW-33 9-9.5 ft	12 JB	27 JB	*	*
MW-34 6-8 ft	7 JB	6 JB	*	*
MW-34 17-17.5 ft	15 JB	37 JB	*	*
Rinsate Blank	*	*	*	*

* Data point not qualified

Amphenol Franklin Curtis RFI
Inorganic Data Validation
April 11, 1996 Water Samples

1. Introduction

This report summarizes the validation of 6 water samples and one equipment blank collected for the Amphenol Franklin Curtis RFI. The samples were analyzed by the Southwest Laboratory of Broken Arrow, OK for metals, cyanide (total and amenable), TSS, TDS, hardness, and alkalinity. Data validation was performed according to the USEPA National Functional Guidelines for Inorganic Analysis (1994) and the Project QAPP.

2. Data Package Completeness

The data package was complete and legible. All analyses requested were completed by the laboratory.

3. Holding Times

All samples were analyzed within the required holding times.

4. Calibration Verification Results

All calibrations were acceptable. Initial calibration verifications (ICV) and continuing calibration verifications (CCV) were analyzed at the appropriate frequency and were within the 90%-110% control limit.

5. Field and Laboratory Blanks

The calibration blank for ICP contained 0.6 ug/l of copper. All copper results for samples associated with this blank were qualified as estimated (JB) if they were less than 5X the reported blank concentration (3 ug/l). All other laboratory blanks contained no detectable contamination.

The equipment blank contained the following concentrations of metals:

Total Barium	2.7 ug/l (13.5)
Total Calcium	199 ug/l (995)
Total Copper	2.3 ug/l (11.5)
Total Nickel	2.9 ug/l (14.5)

All results for these elements were qualified as estimated (JB) if less than 5X the reported blank concentration (5x limit). No other elements were detected in the equipment blank.

6. ICP Interference Check Sample Results

ICP interference check samples were analyzed at the required frequency and the results were within 20% of the true value.

7. Laboratory Control Sample Results

Laboratory control samples were analyzed at the required frequency and were within the 80%-120% control limit.

8. Laboratory and Field Duplicate Results

All laboratory duplicates were not designated on the chain of custody. The laboratory did not perform a duplicate analysis. The field duplicate for total iron and aluminum in GW-34 exceeded 30% RPD. All total iron and aluminum results for are qualified as estimated (J) due to poor field precision. All other field duplicate results were less than 30% RPD.

9. Matrix Spike Recovery Results

MS/MSD samples were not designated on the chain of custody. The laboratory did not perform a MS/MSD analysis.

10. Furnace Atomic Absorption Results

Duplicate injections were performed for all furnace elements. All duplicate injections were within 20% RPD.

11. ICP Serial Dilution Results

The ICP Serial Dilutions were acceptable.

12. Post Digestion Spikes

The following furnace post digestion spikes exceeded the 85-115% control limit

GW-MW--31	Arsenic, total	83 % R
	Thallium, total	75 % R
GW-MW-32	Lead, total	122 % R
	Thallium, total	79 %R
GW-MW-33	Lead, total	117 %R
GW-MW-34	Thallium, total	65 %R

The results for the above samples are qualified as estimated (J) due to matrix interference.

13. Detection Limit Results

All methods exhibited appropriate sensitivity to achieve the required detection limits. Several samples required dilution to eliminate background interferences.

14. Sample Results

Raw data results were compared with the final report and all values were correctly reported. Based on professional judgment, the data can be used with the qualifications outlined in Table 1.

Table 1

Amphenol Franklin Curtis RFI
Inorganic Data Validation
April 11, 1996 Water Samples

Sample	GW-MW-31	GW-MW-32	GW-MW-33	GW-MW-34	GW-MW-34D	GW-EB
Aluminum	219 J	173 J	297 J	122 J	198 J	*
Arsenic	1.6 UJ	*	*	*	*	*
Barium	*	*	*	*	*	2.7 JB
Calcium	*	*	*	*	*	199 JB
Copper	*	0.61 JB	1.1 JB	*	0.79 J	2.3 JB
Iron	391 J	343 J	514 J	329 J	536	*
Lead	*	1.3 UJ	1.3 UJ	*	*	*
Nickel	0.89 JB	*	1.9 JB	1.0 JB	1.4 JB	2.9 JB
Thallium	0.9 UJ	0.9 UJ	*	0.9 UJ	0.9 UJ	*

* Data point not qualified

Amphenol Franklin Curtis RFI
Volatile Organics Data Validation
April 11, 1996 Water Samples

1. Introduction

This report summarizes the validation of 8 water samples and 1 equipment blank collected for the Amphenol Franklin Curtis RFI on April 11, 1996. The samples were analyzed by the Southwest Laboratory of Broken Arrow, OK for Volatile Organics. Data validation was performed according to the USEPA National Functional Guidelines for Organic Analyses (1994) and the Project QAPP..

2. Data Package Completeness and Accuracy

All forms and data necessary for validation were included in the data package.

3. Holding Times

All samples were analyzed within the two week hold time.

4. GC/MS Instrument Performance Check

BFB was analyzed at the required frequency. Mass spectra for BFB met the required ion abundances.

5. Initial Calibration

The following initial calibration standard RRFs were greater than 30% RSD:

Bromomethane	42.9% RSD
Chloroethane	34.4% RSD

The exceeding of %RSD criteria for these compounds was caused by high RFs in the 5 ppb standard. This deviation would not affect non-detectable samples as it indicates increased sensitivity at the low end of the curve.

All other initial calibration compounds were less than 30% RSD. All RRFs were greater than 0.05.

6. Continuing Calibration Check

All continuing calibration compounds were less than 25% RPD.

All RRFs were > 0.05 in the continuing calibration check standard.

7. Blanks

All instrument blanks were acceptable.

The equipment blank contained 68 ug/l of acetone. Results for this compound are qualified as estimated due to potential field contamination.

8. System Monitoring Compounds

All surrogate recoveries were within acceptable limits.

9. MS/MSD

Trichloroethylene and 1,1-Dichloroethylene in samples MW-31 MS/MSD and MW-34 MS/MSD exceeded recovery and %RPD criteria. The results obtained are summarized below:

Sample	Trichloroethylene	1,1-Dichloroethylene
MW-31 MS	80%	84%
MW-31 MSD	0%	54%
RPD	200%	34%
MW-34 MS	100%	102%
MW-34 MSD	78%	133%
RPD	133%	27%

These results indicate a laboratory problem related to the analysis of these samples. Results for these two compounds are considered estimated (J) for the above samples.

All other MS/MSD compounds were within 25% RPD and 75%-125% recovery.

10. LCS

The LCS samples were analyzed at the required frequency and were within acceptable limits.

11. Internal Standards

Internal standards were within acceptable limits for all samples.

12. Detection Limits

RFI detection limits were obtained on all samples. Several samples contained high levels of halogenated volatile organics that exceeded linear range (MW-31, MW-34, and MW-12). The diluted results should be used for the RFI.

13. Duplicate Analysis

Field duplicates were within acceptable limits for all compounds.

14. Data Accuracy

All quanitations were performed correctly. Mass spectra indicated proper compound identification.

15. Overall Assessment of the Data

Based on professional judgment, this data set can be used with the qualification listed on Table 1.

Table 1

Amphenol Franklin Curtis RFI
Volatile Organics Data Validation
April 11, 1996 Water Samples

Sample	Acetone	Trichloroethylene	1,1-Dichloroethene
GW-MW-12	*	*	*
GW-MW-31	*	130 J	3 J
GW-MW-32	*	*	*
GW-MW-33	*	*	*
GW-MW-34	*	120 J	5 UJ
GW-MW-34D	*	160 J	5 UJ
GW-EB	68 J	*	*

* Data point not qualified

NET NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Tim Bannister
EMCON
7205 Shadeland Station
Suite 120
Indianapolis, IN 46256

08/10/1995

NET Job Number: 95.03158

Client Project ID: AMPHENOL - FRANKLIN

Analyte	Result	Flag	Units	Reporting Limit	Date Analyzed	Analyst Initials	Prep Batch No.	Run Batch No.	Method Reference
SAMPLE NO. 113763	SAMPLE DESCRIPTION EFF							DATE-TIME TAKEN 08/03/1995	
ICP METALS - DISS (AQ)	Complete			Complete	08/09/1995	dak		44	
Arsenic, diss. (ICP)	<0.20		mg/L	<0.20	08/09/1995	dak		44	S-6010
Cadmium, diss. (ICP)	<0.005		mg/L	<0.005	08/09/1995	dak		44	S-6010
Chromium, diss. (ICP)	<0.010		mg/L	<0.010	08/09/1995	dak		44	S-6010
Copper, diss. (ICP)	<0.020		mg/L	<0.020	08/09/1995	dak		44	S-6010
Lead, diss. (ICP)	<0.080		mg/L	<0.080	08/09/1995	dak		44	S-6010
Mercury, diss (CVAA)	<0.0005		mg/L	<0.0005	08/08/1995	grf		6	S-7470
Nickel, diss. (ICP)	<0.010		mg/L	<0.010	08/09/1995	dak		44	S-6010
Zinc, diss. (ICP)	<0.020		mg/L	<0.020	08/09/1995	dak		44	S-6010

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Fax: (317) 842-4286

QUALITY CONTROL REPORT
CONTINUING CALIBRATION VERIFICATION

Mr. Tim Bannister
EMCON
7205 Shadeland Station
Suite 120
Indianapolis, IN 46256

08/10/1995

NET Job Number: 95.03158

Analyte	Prep Batch No.	Run Batch No.	CCV True Value	CCV Conc Found	CCV % Rec	Flag	Date Analyzed
Arsenic, diss. (ICP)		44	5.0	5.21	104		08/09/1995
Cadmium, diss. (ICP)		44	5.0	5.31	106		08/09/1995
Chromium, diss. (ICP)		44	5.0	5.36	107		08/09/1995
Copper, diss. (ICP)		44	5.0	4.98	100		08/09/1995
Lead, diss. (ICP)		44	5.0	5.50	110		08/09/1995
Mercury, diss (CVAA)		6	0.015	0.0151	101		08/08/1995
Nickel, diss. (ICP)		44	5.0	5.39	108		08/09/1995
Zinc, diss. (ICP)		44	5.0	5.32	106		08/09/1995
VOLATILE- E-624 (AQ)							
Benzene		859	20.	18.	90		08/04/1995
Bromoform		859	20.	17.	85		08/04/1995
Chlorobenzene		859	20.	19.	95		08/04/1995
Chloroform		859	20.	20.	100		08/04/1995
Chloromethane		859	20.	23.	115		08/04/1995
1,1-Dichloroethene		859	20.	17.	85		08/04/1995
1,2-Dichloropropane		859	20.	18.	90		08/04/1995
Ethylbenzene		859	20.	18.	90		08/04/1995
Methylene chloride		859	20.	22.	110		08/04/1995
1,1,2,2-Tetrachloroethane		859	20.	19.	95		08/04/1995
Toluene		859	20.	19.	95		08/04/1995
Vinyl chloride		859	20.	20.	100		08/04/1995

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Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

QUALITY CONTROL REPORT
BLANKS

Mr. Tim Bannister
EMCON
7205 Shadeland Station
Suite 120
Indianapolis, IN 46256

08/10/1995

NET Job Number: 95.03158

Analyte	Prep Batch No.	Run Batch No.	Blank Value	Flag	Units	Reporting Limit	Date Analyzed
Arsenic, diss. (ICP)		44	<0.20		mg/L	<0.20	08/09/1995
Cadmium, diss. (ICP)		44	<0.005		mg/L	<0.005	08/09/1995
Chromium, diss. (ICP)		44	<0.010		mg/L	<0.010	08/09/1995
Copper, diss. (ICP)		44	<0.020		mg/L	<0.020	08/09/1995
Lead, diss. (ICP)		44	<0.080		mg/L	<0.080	08/09/1995
Mercury, diss (CVAA)		6	<0.0005		mg/L	<0.0005	08/08/1995
Nickel, diss. (ICP)		44	<0.010		mg/L	<0.010	08/09/1995
Zinc, diss. (ICP)		44	<0.020		mg/L	<0.020	08/09/1995
VOLATILE- E-624 (AQ)							
Acrolein		859	<50.		ug/L	<50.	08/04/1995
Acrylonitrile		859	<50.		ug/L	<50.	08/04/1995
Benzene		859	<5.0		ug/L	<5.0	08/04/1995
Bromodichloromethane		859	<5.0		ug/L	<5.0	08/04/1995
Bromoform		859	<5.0		ug/L	<5.0	08/04/1995
Bromomethane		859	<5.0		ug/L	<5.0	08/04/1995
Carbon tetrachloride		859	<5.0		ug/L	<5.0	08/04/1995
Chlorobenzene		859	<5.0		ug/L	<5.0	08/04/1995
Chloroethane		859	<10.		ug/L	<10.	08/04/1995
2-Chloroethyl vinyl ether		859	ND		ug/L	ND	08/04/1995
Chloroform		859	<5.0		ug/L	<5.0	08/04/1995
Chloromethane		859	<10.		ug/L	<10.	08/04/1995
Dibromochloromethane		859	<5.0		ug/L	<5.0	08/04/1995
1,2-Dichlorobenzene		859	<5.0		ug/L	<5.0	08/04/1995
1,3 Dichlorobenzene		859	<5.0		ug/L	<5.0	08/04/1995
1,4-Dichlorobenzene		859	<5.0		ug/L	<5.0	08/04/1995
1,1-Dichloroethane		859	<5.0		ug/L	<5.0	08/04/1995
1,2-Dichloroethane		859	<5.0		ug/L	<5.0	08/04/1995
1,1-Dichloroethene		859	<5.0		ug/L	<5.0	08/04/1995
trans-1,2-Dichloroethene		859	<5.0		ug/L	<5.0	08/04/1995
cis-1,2-Dichloroethene		859	<5.0		ug/L	<5.0	08/04/1995
1,2-Dichloropropane		859	<5.0		ug/L	<5.0	08/04/1995
cis-1,3-Dichloropropene		859	<5.0		ug/L	<5.0	08/04/1995
trans-1,3-Dichloropropene		859	<5.0		ug/L	<5.0	08/04/1995
Ethylbenzene		859	<5.0		ug/L	<5.0	08/04/1995

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Tel: (317) 842-4261
Fax: (317) 842-4286

QUALITY CONTROL REPORT
MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Mr. Tim Bannister
EMCON
7205 Shadeland Station
Suite 120
Indianapolis, IN 46256

08/10/1995

NET Job Number: 95.03158

Analyte	Prep Batch No.	Run Batch No.	Conc. Spike Added	Units	Sample Result	Conc. MS Result	MS % Rec.	Conc. MSD Result	MSD % Rec.	RPD	Flag	Date Analyzed
Arsenic, diss. (ICP)		44	1.0	mg/L	<0.20	1.02	102	0.971	97	4.8		08/09/1995
Chromium, diss. (ICP)		44	1.0	mg/L	<0.010	0.907	91	0.891	89	1.8		08/09/1995
Copper, diss. (ICP)		44	1.0	mg/L	0.02	0.902	88	0.867	85	4		08/09/1995
Lead, diss. (ICP)		44	1.0	mg/L	0.11	0.948	84	0.928	82	2.4		08/09/1995
Mercury, diss (CVAA)		6	0.015	mg/L	<0.0005	0.0152	101	0.0140	93	8.1		08/08/1995
Nickel, diss. (ICP)		44	1.0	mg/L	0.03	0.915	89	0.887	86	3.2		08/09/1995
Zinc, diss. (ICP)		44	1.0	mg/L	0.07	0.967	90	0.943	87	2.7		08/09/1995

NET NATIONAL ENVIRONMENTAL TESTING, INC.

CHAIN OF CUSTODY RECORD

COMPANY Emcon
ADDRESS On File
PHONE 841-8845 FAX
PROJECT NAME/LOCATION Amphenol
PROJECT NUMBER
PROJECT MANAGER

REPORT TO: Tim Bannister
INVOICE TO:
P.O. NO.
NET QUOTE NO.

SAMPLED BY
Tim Bannister
(PRINT NAME) SIGNATURE
Dave Kirk
(PRINT NAME) SIGNATURE

To assist us in selecting the proper method
Is this work being conducted for regulatory compliance monitoring? Yes ____ No ____
Is this work being conducted for regulatory enforcement action? Yes ____ No ____
Which regulations apply: RCRA ____ NPDES Wastewater ____
UST ____ Drinking Water ____
Other ____ None ____

DATE	TIME	SAMPLE ID/DESCRIPTION	MATRIX	GRAB	COMP	# and Type of Containers: HCl	NaOH	HNO₃	H₂SO₄	OTHER	ANALYSES: VOA	DISSOLVED METALS							
8/3		RW-1	W			~~IIII~~					✓								
		RW-2				~~IIII~~					✓								
		RW-3				~~IIII~~					✓								
		EFF				~~IIII~~					✓	✓							
		RW-1 DUP									✓								
		TRIP BLANK									✓								

COMMENTS
ALL SAMPLES UNPRESERVED

CONDITION OF SAMPLE: BOTTLES INTACT? [✓ YES] / NO
FIELD FILTERED? [✓ YES] / NO
COC SEALS PRESENT AND INTACT? YES / NO N/A
VOLATILES FREE OF HEADSPACE? [✓ YES] / NO
TEMPERATURE UPON RECEIPT: Cool
Bottles supplied by NET? [✓ YES] NO

SAMPLE REMAINDER DISPOSAL: RETURN SAMPLE REMAINDER TO CLIENT VIA ____
I REQUEST NET TO DISPOSE OF ALL SAMPLE REMAINDERS ____ DATE ____

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	RELINQUISHED BY:	DATE	TIME	RECEIVED FOR NET BY:
			[illegible]		8/3/95	5:00	Melissa Jent

METHOD OF SHIPMENT

REMARKS:
Arsenic, Cadmium, Chromium, Cu, Pb, Hg, Ni, Zn

... NET PROJECT MANAGER - YELLOW ... CUSTOMER COPY - PINK

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ANALYTICAL REPORT

RECEIVED
AUG 9 95

Mr. Tim Bannister
EMCON
7205 Shadeland Station
Suite 120
Indianapolis, IN 46256

08/07/1995

Sample No.: 113797
Job No.: 95.03166
P.O. NO.:

Page 1

Sample Description: EFFLUENT
Job Description: AMPHENOL - FRANKLIN

Date Taken: 08/04/1995 Date Received: 08/04/1995

Parameters	Results	Flag	Units	Analyst/ Date of Analysis	Method Number	Method PQL
Cyanide - Prep	Complete			ddm / 08/07/1995		Complete
Cyanide, Total	<0.005		mg/L	ddm / 08/07/1995	E-335.2	<0.005

Project Manager

NET NATIONAL ENVIRONMENTAL TESTING, INC.

CHAIN OF CUSTODY RECORD

COMPANY EMCON
ADDRESS 7205 Shadeland Sta. Ste 120
PHONE 841-8845 FAX 841-0614
PROJECT NAME/LOCATION AMPHENOL, Franklin
PROJECT NUMBER 84768-002.000
PROJECT MANAGER Tim Bannister

REPORT TO: Tim Bannister
INVOICE TO: (same)
P.O. NO.
NET QUOTE NO.

SAMPLED BY Timothy A. Bannister (PRINT NAME) Timothy A. Bannister SIGNATURE
(PRINT NAME) SIGNATURE

To assist us in selecting the proper method
Is this work being conducted for regulatory compliance monitoring? Yes ____ No ____
Is this work being conducted for regulatory enforcement action? Yes ____ No ____
Which regulations apply: RCRA ____ NPDES Wastewater ____ UST ____ Drinking Water ____ Other ____ None ____

DATE	TIME	SAMPLE ID/DESCRIPTION	MATRIX	GRAB	COMP	HCl	NaOH	HNO_3	H_2SO_4	OTHER	ANALYSES	Cyanide								COMMENTS
						# and Type of Containers														
8/4/95	0925	Effluent		X			X					X								

CONDITION OF SAMPLE: BOTTLES INTACT? [✓ YES] NO
FIELD FILTERED? YES [✓ NO]
COC SEALS PRESENT AND INTACT? YES / NO N/A
VOLATILES FREE OF HEADSPACE? YES / NO
TEMPERATURE UPON RECEIPT: Chilled
Bottles supplied by NET? [✓ YES] NO

SAMPLE REMAINDER DISPOSAL: RETURN SAMPLE REMAINDER TO CLIENT VIA ____
I REQUEST NET TO DISPOSE OF ALL SAMPLE REMAINDERS ____ DATE ____

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	RELINQUISHED BY:	DATE	TIME	RECEIVED FOR NET BY:
Timothy A. Bannister	8/4/95	10:05			8/4/95	10:05	Melissa Gert

METHOD OF SHIPMENT
REMARKS:

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ANALYTICAL REPORT

Mr. Angelo J. Datillo
EMCON
8888 Keystone Crossing
Suite 1329
Indianapolis, IN 46240

12/20/1995

NET Job Number: 95.05847

Enclosed are the Analytical Results for the following samples submitted to NET, Inc. Indianapolis Division for analysis:

Project Description: AMPHENOL/FRANKLIN, IN

Sample Number	Sample Description	Date Taken	Date Received
126752	EFFLUENT	12/13/1995	12/13/1995

Sample analysis in support of the project referenced above has been completed and results are presented on the following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please do not hesitate to call. NET has been pleased to provide these analytical services for you.

Approved By:

Andrew Sargent (PLK)

Project Manager

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Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Angelo J. Darillo
EMCON
5585 Keystone Crossing
Suite 1329
Indianapolis, IN 46240

12/20/1995

Sample No.: 126752
Job No.: 95.05847
P.O. No.: 41354

Page 2

Sample Description: EFFLUENT
Job Description: AMPHENOL/FRANKLIN, IN

Date Taken: 12/13/1995 Date Received: 12/13/1995

Parameter	Result	Flag	Units	Analyst/ Date of Analysis	Method Number	Method PQL
Cyanide - Prep	Complete			lad / 12/14/1995		Complete
Cyanide, Total	0.005		mg/L	ddm / 12/20/1995	E-335.2	<0.005
Arsenic, diss. (GFAA)	<0.005		mg/L	grf / 12/14/1995	S-7060	<0.005
Cadmium, diss. (ICP)	<0.005		mg/L	dak / 12/14/1995	S-6010	<0.005
Chromium, diss. (ICP)	<0.010		mg/L	dak / 12/14/1995	S-6010	<0.010
Copper, diss. (ICP)	<0.020		mg/L	dak / 12/14/1995	S-6010	<0.020
Lead, diss. (ICP)	<0.080		mg/L	dak / 12/14/1995	S-6010	<0.080
Mercury, diss (CVAA)	<0.0005		mg/L	grf / 12/14/1995	S-7470	<0.0005
Nickel, diss. (ICP)	<0.010		mg/L	dak / 12/14/1995	S-6010	<0.010
Zinc, diss. (ICP)	<0.020		mg/L	dak / 12/14/1995	S-6010	<0.020

NET NATIONAL ENVIRONMENTAL TESTING, INC.

CHAIN OF CUSTODY RECORD

COMPANY EMCON
ADDRESS 8888 KEYSTONE CROSSING
PHONE 575-4148 FAX
PROJECT NAME/LOCATION AMPHENOL/ FRANKLIN, IN
PROJECT NUMBER
PROJECT MANAGER Angelo J. Dattilo

REPORT TO: Angelo J. Dattilo.
INVOICE TO: EMCON - SACRAMENTO
P.O. NO.
NET QUOTE NO.

SAMPLED BY
ANGELO J. DATTILO (PRINT NAME) Angelo J. Dattilo SIGNATURE
(PRINT NAME) SIGNATURE

DATE	TIME	SAMPLE ID/DESCRIPTION	MATRIX	GRAB	COMP	# and Type of Containers: HCl	NaOH	HNO$_3$	H$_2$SO$_4$	OTHER	ANALYSES: RCRA METALS	CN
12/13	3pm	EFFLUENT	GW	✓			x (1)	x (1)			x	x

To assist us in selecting the proper method

Is this work being conducted for regulatory compliance monitoring? Yes ____ No ____

Is this work being conducted for regulatory enforcement action? Yes ____ No ____

Which regulations apply: RCRA ____ NPDES Wastewater ____
UST ____ Drinking Water ____
Other ____ None ____

COMMENTS

DISSOLVED METALS

CONDITION OF SAMPLE: BOTTLES INTACT? [✓ YES] / NO
FIELD FILTERED? [✓ YES] / NO

COC SEALS PRESENT AND INTACT? YES / NO NA
VOLATILES FREE OF HEADSPACE? YES / NO NA

TEMPERATURE UPON RECEIPT: CHILLED
Bottles supplied by NET? [✓ YES] / NO

SAMPLE REMAINDER DISPOSAL: RETURN SAMPLE REMAINDER TO CLIENT VIA
I REQUEST NET TO DISPOSE OF ALL SAMPLE REMAINDERS DATE

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	RELINQUISHED BY:	DATE	TIME	RECEIVED FOR NET BY:
Angelo J. Dattilo	12/13/95	AJD 4:05					Kath Schaag

METHOD OF SHIPMENT
NET COOLER

4:03pm

REMARKS:
METALS = As, Cd, Cr, Cu, Pb, Hg, Ni, Zn PER ANGELO (As by GFAA)

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ALTERNATIVE 3: GROUNDWATER EXTRACTION AND TREATMENT

ESTIMATED CAPITAL COST

Project Name:	Amphenol Corp. / Franklin Power Products
Project No.:	07026.08

Cost includes installation of one groundwater extraction well, conversion of one monitoring well to an extraction well, installation of two well pumps, header piping, and electrical supply for a groundwater extraction system.
The existing ICM air stripper will be used for the treatment of extracted groundwater.

Assumptions:

(1). All work will be done under Level D protection.
(2). Wells will be flush mount type.
(3). One new extraction well will be installed and one existing monitoring well will be converted to a pumping well.
(4). Extraction well depth will be 20 feet.
(5). Extraction wells will be 2-inch diameter with 5-foot stainless steel screen and stainless steel casing.
(6). ICM air stripper is in place and operational.

SHIPPING FOR THIS PROJECT (%): (cost of shipping equipment to site as a percentage of total equipment cost)	0
ENGINEERING FOR THIS PROJECT (%): (estimate of engineering costs is based on total installed equipment cost)	20
CONSTRUCTION MANAGEMENT FOR THIS PROJECT (%): (estimate of construction management costs is based on total installed equipment cost)	10
CONTINGENCIES FOR THIS PROJECT (%): (based on total installed equipment cost)	20

Unit costs for certain items presented in this estimate taken from 1995 Means and ECHOS Environmental Restoration cost estimating guides. Other costs presented in this estimate are based on vendor quotes or past experience.

Estimated Construction Costs - Alternative 3: Groundwater Extraction and Treatment

ITEM #	WORK ITEM	UNIT	Estimated Quantity	Equip/mtr. Unit Price	Equip/mtr. Extended Price	Labor Unit Price	Labor Extended Price	Total Installed Price
1.	Mobilization/demobilization	LS	1	$430	$430	$825	$825	$1,255
2.	Extraction Well Drilling and Installation							
(1).	Crew Per Diem Expenses	DY	6	$0.00	$0	$95.00	$570	$570
(2).	Mud Drilling (2" diameter borehole)	LF	20	$4.90	$98	$11.60	$232	$330
(3).	Filter Pack	LF	5	$8.50	$43	$1.50	$8	$50
(4).	Concrete Surface Pad	EA	1	$3.50	$4	$1.50	$2	$5
(5).	Grout	LF	15	$1.11	$17	$0.00	$0	$17
(6).	Bentonite Seal	EA	1	$25.00	$25	$6.00	$6	$31
(7).	Drums for Well Cuttings	EA	1	$53.00	$53	$0.00	$0	$53
(8).	Manhole Cover	EA	1	$78.00	$78	$26.82	$27	$105
(9).	Well Casing (2" SS)	LF	15	$19.30	$290	$1.69	$25	$315
(10).	Well Screen (2"SS)	LF	5	$44.32	$222	$1.43	$7	$229
(11).	Move Drill Rig	EA	1	$25.84	$26	$13.40	$13	$39
(12).	Decontamination	EA	1	$10.00	$10	$60.00	$60	$70
(13).	Drum Disposal	EA	1	$0.00	$0	$325.00	$325	$325
3.	Groundwater Header Piping, Lateral Piping, Valves							
(1).	Header Piping (6-inch)	LF	900	$1.45	$1,305	$5.46	$4,914	$6,219
(2).	Lateral Piping (2-inch, 10 LF each well)	LF	20	$1.30	$26	$5.46	$109	$135
(3).	Trenching/Backfill/Compaction	LF	900	$0	$0	$5.50	$4,950	$4,950
(4).	Flow Monitoring Stations	EA	2	$100	$200	$20.00	$40	$240
(5).	Isolation Valves	EA	2	$65	$130	$16.56	$33	$163
(6).	Throttling valves	EA	2	$65	$130	$16.56	$33	$163
(7).	Paving Repair	LS	1	$2,000	$2,000	$2,000.00	$2,000	$4,000
4.	Well Pumps and Accessories							
(1).	Well Pumps (5 gpm, 30 psig)	EA	2	$8,400	$16,800	$750	$1,500	$18,300
(2).	Electrical Conduit	LF	1000	$2	$2,000	$6	$6,000	$8,000

(3).	Electrical Cables	LF	6000	$0.20	$1,200	$0.34	$2,040	$3,240
(4).	Electrical Equipment and Terminations	LS	2	$200	$400	$500	$1,000	$1,400
5.	Utilities							
(1).	Electrical Service to Enclosure	LS	1	$500.00	$500	$1,500.00	$1,500	$2,000
	SUBTOTAL:				$26,000		$26,200	$52,200

SUBTOTAL:	$52,200
ENGINEERING:	$10,400
CONSTRUCTION MANAGEMENT:	$5,200
CONTINGENCIES:	$10,400
TOTAL (CAPITAL COSTS):	$78,200

ALTERNATIVE 4: GROUNDWATER SPARGING AND SVE
ESTIMATED CAPITAL COST

Project Name:	Amphenol Corp. / Franklin Power Products
Project No.:	07026.08

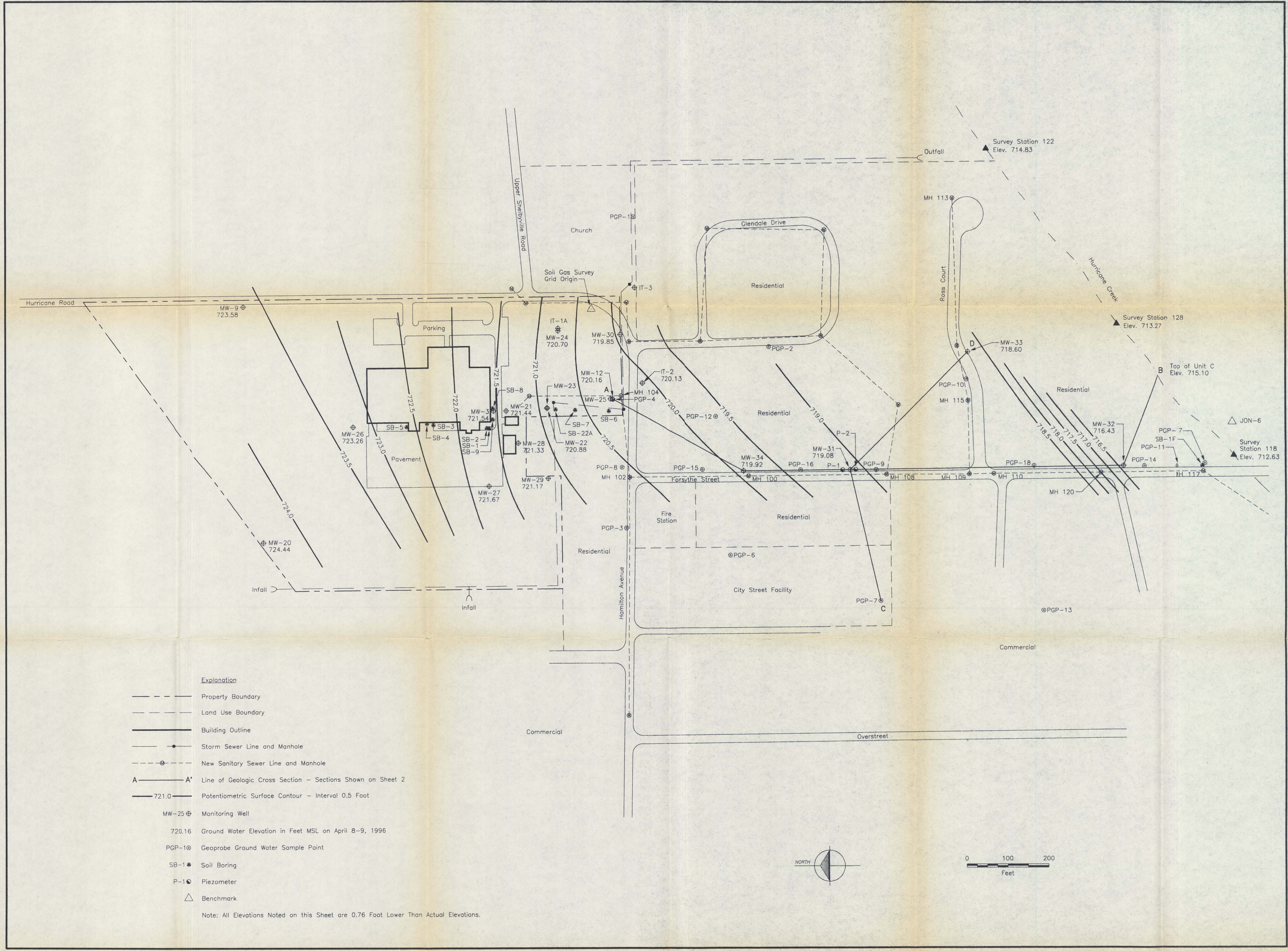
Cost include installation of air sparging wells, SVE wells, and associated piping and equipment.

Assumptions:

(1). All work will be done under Level D protection.
(2). Wells will be flush mount type.
(3). Twelve air sparging wells will be installed; three SVE wells will be installed.
(4). Total sparging well depth is 26 feet; total SVE well depth is 10 feet.
(5). Sparging wells will be 2-inch diameter with 2-foot stainless steel screen and stainless steel casing.
(6). SVE wells will be 4-inch diameter with 5-foot PVC screen and PVC casing.
(7). No control of SVE vapor emissions is included.
(8). ICM air stripper is in place and operational.
(9). An additional enclosure will be required.

SHIPPING FOR THIS PROJECT (%): (cost of shipping equipment to site as a percentage of total equipment cost)	0
ENGINEERING FOR THIS PROJECT (%): (estimate of engineering costs is based on total installed equipment cost)	20
CONSTRUCTION MANAGEMENT FOR THIS PROJECT (%): (estimate of construction management costs is based on total installed equipment cost)	10
CONTINGENCIES FOR THIS PROJECT (%): (based on total installed equipment cost)	20

Unit costs for certain items presented in this estimate taken from 1995 Means and ECHOS Environmental Restoration cost estimating guides. Other costs presented in this estimate are based on vendor quotes or past experience.



Explanation

— — —	Property Boundary
— — — —	Land Use Boundary
▬▬	Building Outline
——●——	Storm Sewer Line and Manhole
– – –Ⓜ– – –	New Sanitary Sewer Line and Manhole
A———A'	Line of Geologic Cross Section – Sections Shown on Sheet 2
——721.0——	Potentiometric Surface Contour – Interval 0.5 Foot
MW-25 ⊕	Monitoring Well
720.16	Ground Water Elevation in Feet MSL on April 8-9, 1996
PGP-1◎	Geoprobe Ground Water Sample Point
SB-1 ●	Soil Boring
P-1 ●	Piezometer
△	Benchmark

Note: All Elevations Noted on this Sheet are 0.76 Foot Lower Than Actual Elevations.

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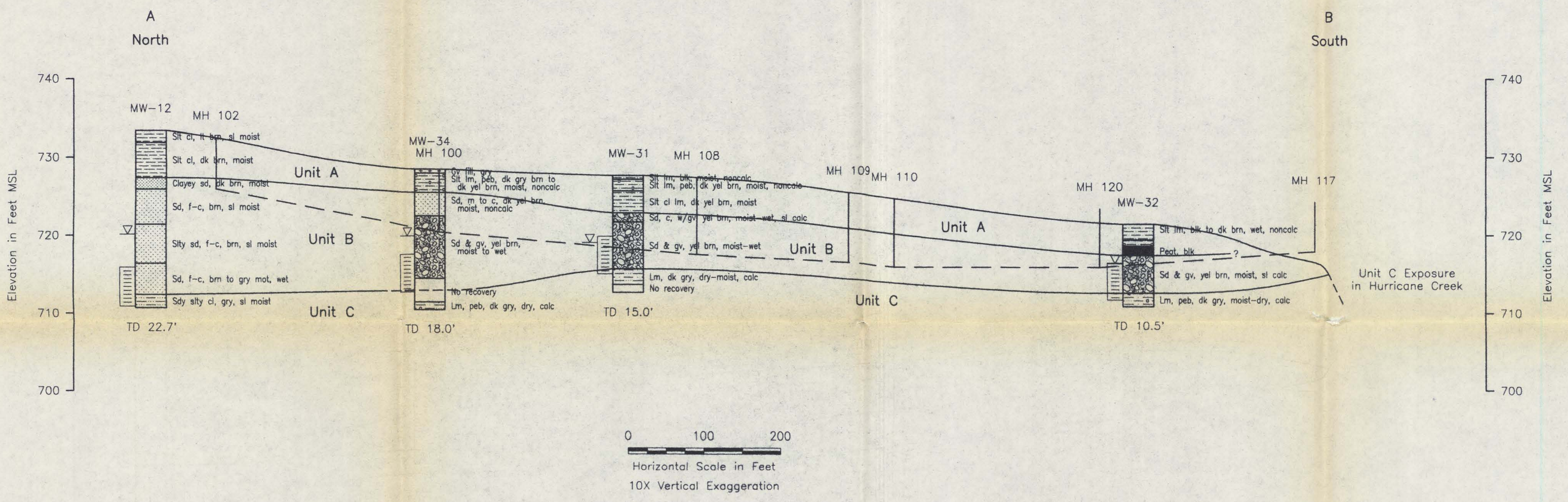
REVISIONS	BY	DATE

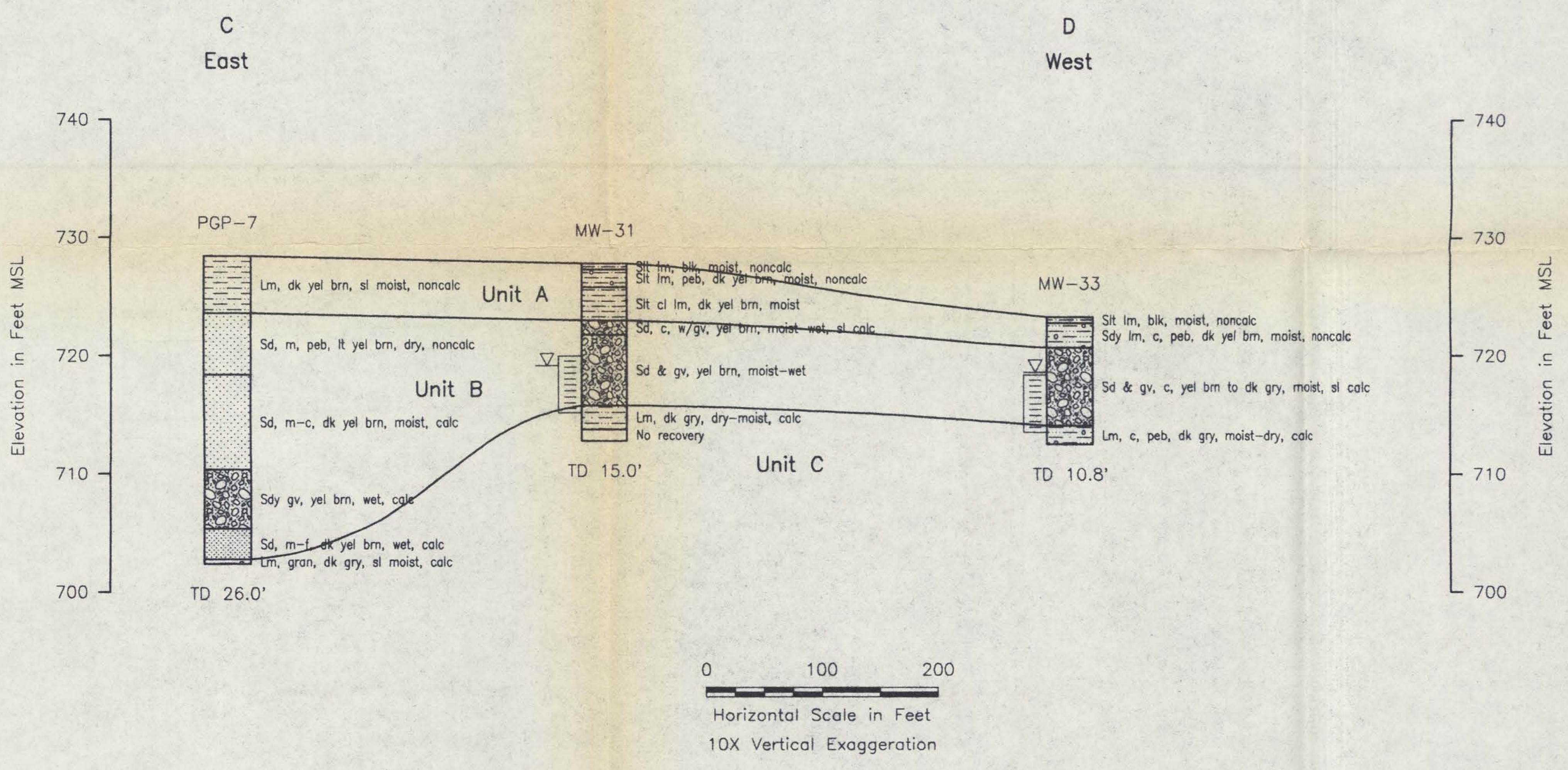
NO.	REVISIONS	BY	DATE
	REVISED IN ACCORDANCE WITH CONSTRUCTION RECORDS		

CURTIS-FRANKLIN
FRANKLIN, INDIANA
FORMER AMPHENOL CMS

SITE MAP

DESIGNED BY JK	DATE MAY '96
DRAWN BY NW	DATE MAY '96
CHECKED BY	DATE
FILE 702608S1	EDIT NE061496
SCALE	1"=100' DRAWING 1:100 PLOT
PROJECT	07026.08
1 SHEET NO.	





Explanation

▤ Well Screen

▽ Ground Water Elevation on April 8-9, 1996

MH 110 | Sanitary Sewer Manhole

— — — Sanitary Sewer Invert

Lines of Cross Section Shown on Sheet 1

All Elevations on this Sheet are 0.76 Foot Lower than Actual Elevations.

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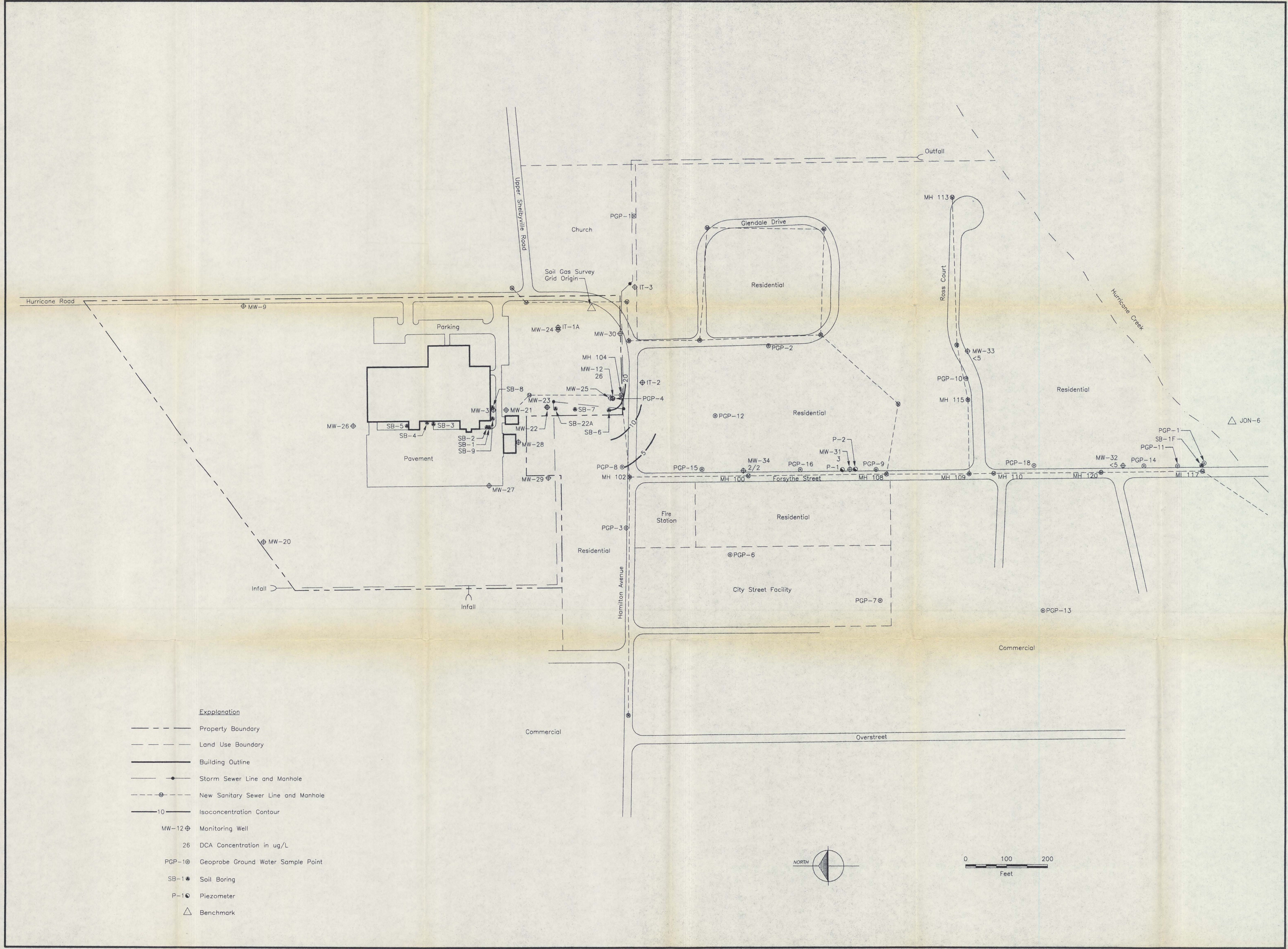
REVISED IN ACCORDANCE WITH CONSTRUCTION RECORDS BY DATE

CURTIS-FRANKLIN
FRANKLIN, INDIANA
FORMER AMPHENOL CMS

GEOLOGIC CROSS SECTIONS

DESIGNED BY NW	DATE MAY '96
DRAWN BY NW	DATE MAY '96
CHECKED BY	DATE
FILE 702608S2	EDIT NW061396
SCALE	AS SHOWN DRAWING 1:10 PLOT
PROJECT	07026.08

2
SHEET NO.



Expplanation

— — — —	Property Boundary
— — — —	Land Use Boundary
———	Building Outline
——●——	Storm Sewer Line and Manhole
– – Ⓜ – –	New Sanitary Sewer Line and Manhole
——10——	Isoconcentration Contour
MW-12 ⊕	Monitoring Well
26	DCA Concentration in ug/L
PGP-1 ◎	Geoprobe Ground Water Sample Point
SB-1 ●	Soil Boring
P-1 ◐	Piezometer
△	Benchmark

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			REVISED IN ACCORDANCE WITH CONSTRUCTION RECORDS		

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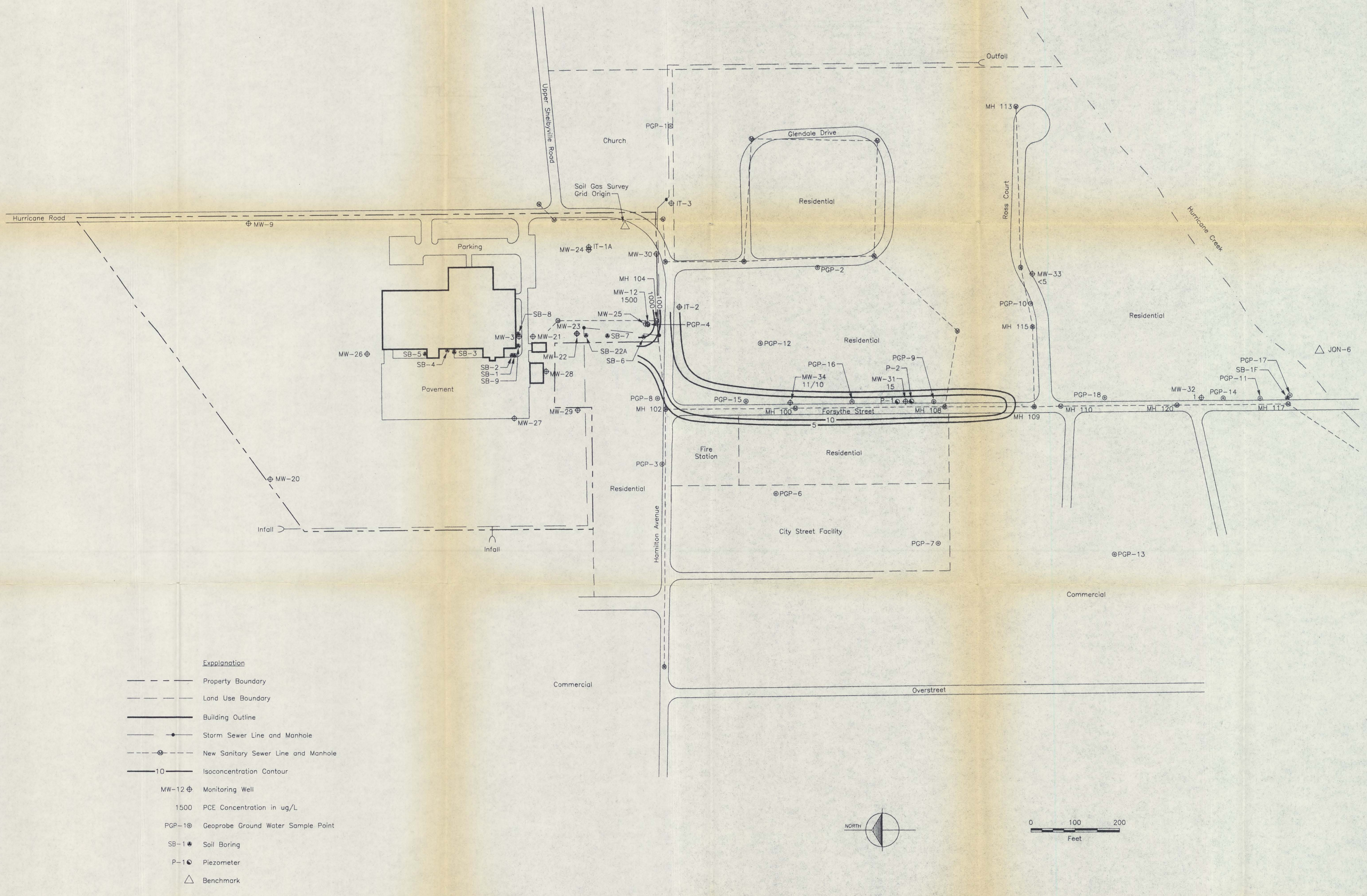
FORMER AMPHENOL CMS

ISOCONCENTRATION MAP OF DCA IN GROUND
WATER - OPERABLE AREA 3, APRIL, 1996

DESIGNED BY JK	DATE MAY '96
DRAWN BY NW	DATE MAY '96
CHECKED BY	DATE
FILE 7026083A	EDIT NW061396
SCALE	1" = 100' DRAWING 1:100 PLOT
PROJECT	07026.08

3A
SHEET NO.



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REVISED IN ACCORDANCE WITH CONSTRUCTION RECORDS BY DATE

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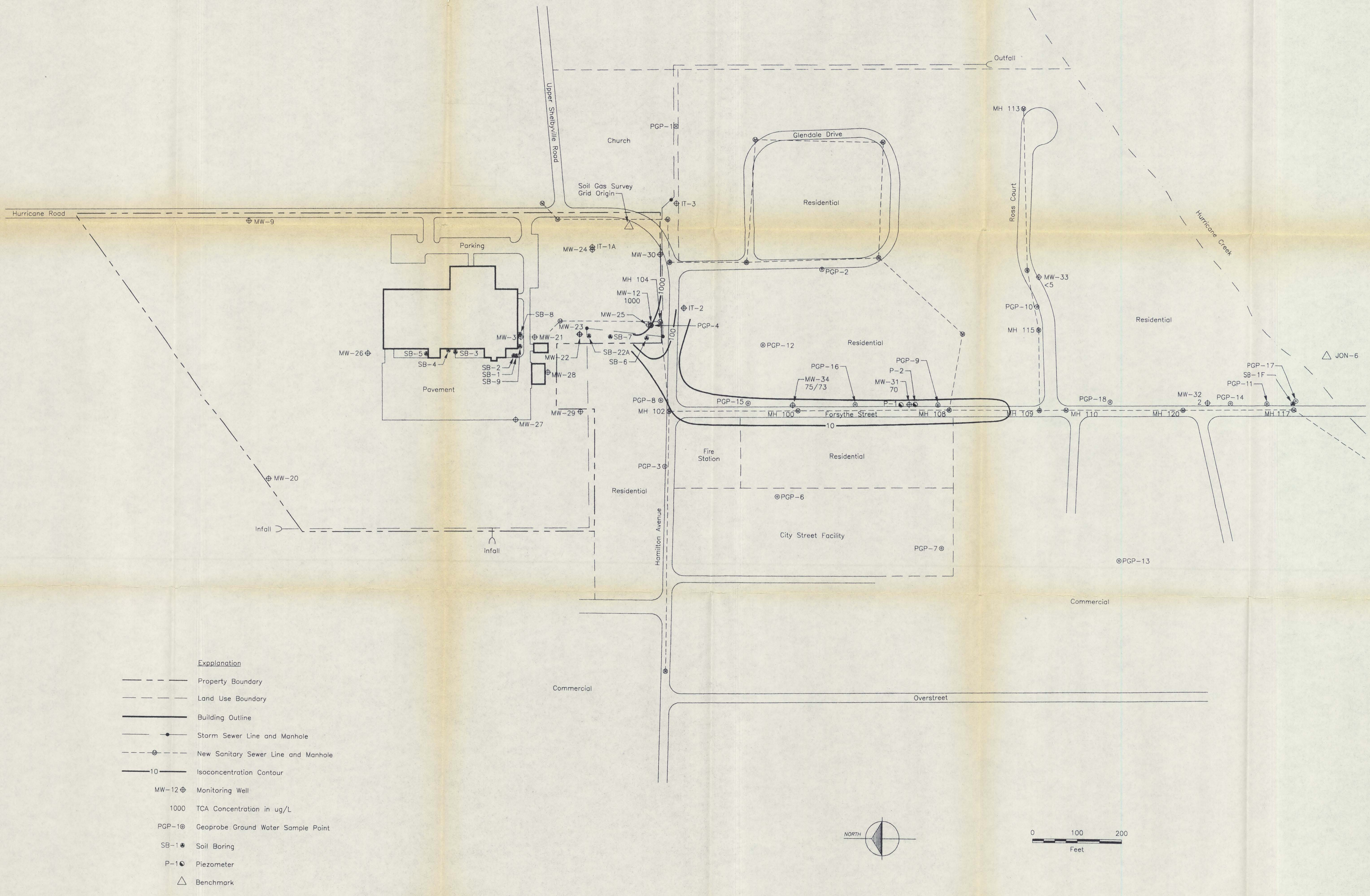
FORMER AMPHENOL CMS

ISOCONCENTRATION MAP OF PCE IN GROUND WATER - OPERABLE AREA 3, APRIL, 1996

DESIGNED BY JK	DATE MAY '96
DRAWN BY NW	DATE MAY '96
CHECKED BY	DATE
FILE 7026083B	EDIT NW061396
SCALE 1" = 100' DRAWING	1:100 PLOT

PROJECT 07026.08

3B
SHEET NO.



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REVISED IN ACCORDANCE WITH CONSTRUCTION RECORDS

NO.	REVISIONS	BY	DATE

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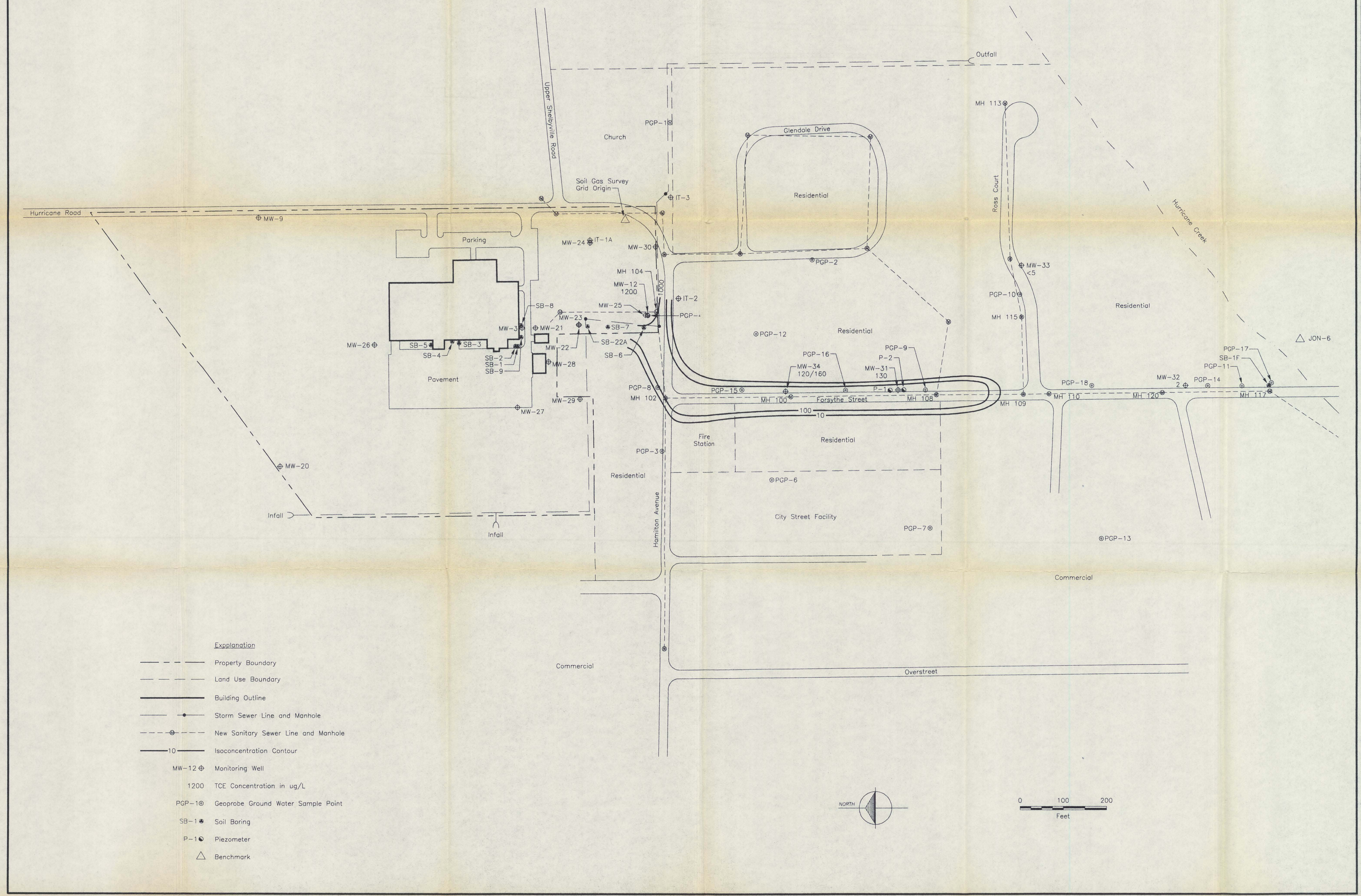
FORMER AMPHENOL CMS

ISOCONCENTRATION MAP OF TCA IN GROUND WATER – OPERABLE AREA 3, APRIL, 1996

DESIGNED BY JK	DATE MAY '96
DRAWN BY NW	DATE MAY '96
CHECKED BY	DATE
FILE 7026083C	EDIT NW061396
SCALE	1" = 100' DRAWING 1:100 PLOT
PROJECT	07026.08

3C
SHEET NO.



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	REVISED IN ACCORDANCE WITH CONSTRUCTION RECORDS		

NO.	REVISIONS	BY	DATE

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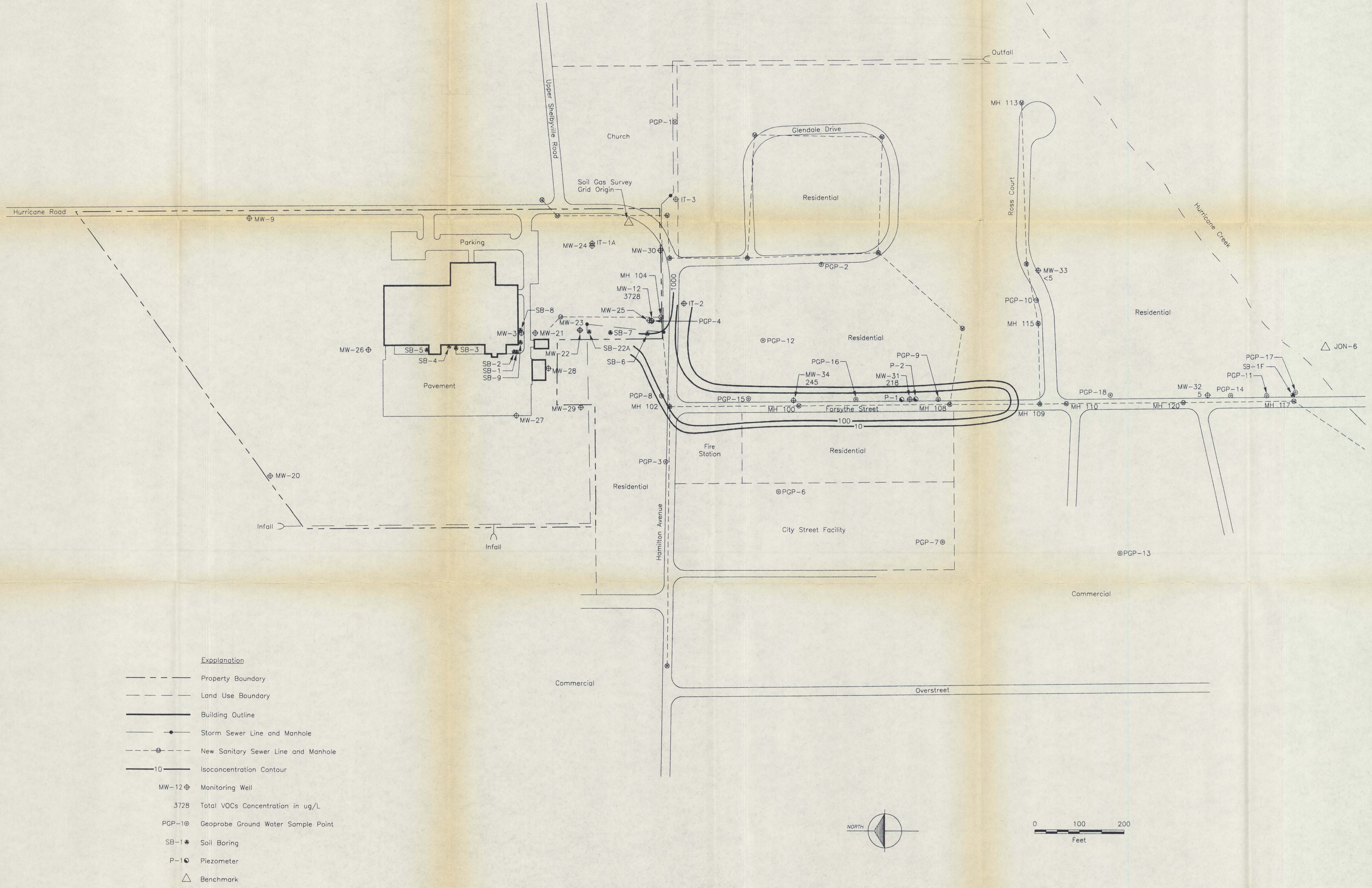
FRANKLIN, INDIANA
FORMER AMPHENOL CMS

ISOCONCENTRATION MAP OF TCE IN GROUND WATER – OPERABLE AREA 3, APRIL, 1996

DESIGNED BY JK	DATE MAY '96
DRAWN BY NW	DATE MAY '96
CHECKED BY	DATE
FILE 7026083D	EDIT NW061396
SCALE	1"=100' DRAWING 1:100 PLOT
PROJECT	07026.08

3D
SHEET NO.



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			REVISED IN ACCORDANCE WITH CONSTRUCTION RECORDS		

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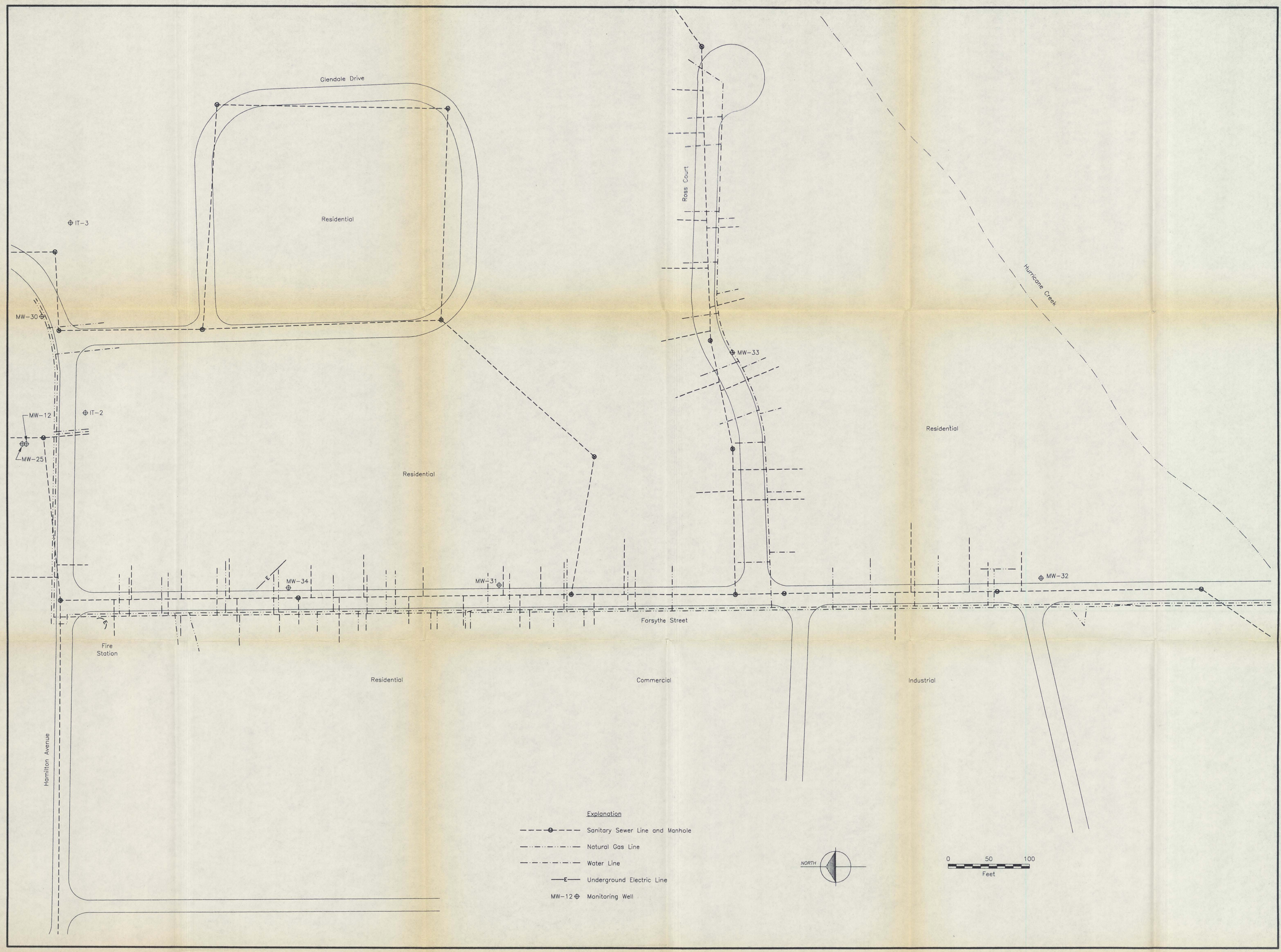
FORMER AMPHENOL CMS

ISOCONCENTRATION MAP OF TOTAL VOCs IN
GROUND WATER-OPERABLE AREA 3, APRIL, 1996

DESIGNED BY JK	DATE MAY '96
DRAWN BY NW	DATE MAY '96
CHECKED BY	DATE
FILE 7026083E	EDIT NW061396
SCALE	1" = 100' DRAWING 1:100 PLOT
PROJECT	07026.08

3E
SHEET NO.



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REVISED IN ACCORDANCE WITH CONSTRUCTION RECORDS

REVISIONS	BY	DATE

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FRANKLIN, INDIANA
FORMER AMPHENOL CMS

LOCATIONS OF UNDERGROUND UTILITIES IN OPERABLE AREA 3

DESIGNED BY JK	DATE OCT, 1996
DRAWN BY NW	DATE OCT, 1996
CHECKED BY	DATE
FILE 19716S4	EDIT NW101196
SCALE	1"=50' DRAWING 1:50 PLOT
PROJECT	19716.09

4

SHEET NO.

Estimated Construction Costs - Alternative 4: Air Sparging with SVE

ITEM #		WORK ITEM	UNIT	Estimated Quantity	Equip/mtr. Unit Price	Equip/mtr. Extended Price	Labor Unit Price	Labor Extended Price	Total Installed Price
1.	Mobilization/demobilization		LS	1	$430	$430	$825	$825	$1,255
2.	Air Sparging Wells Drilling and Installation								
	(1).	Crew Per Diem Expenses	DY	6	$0.00	$0	$95.00	$570	$570
	(2).	Mud Drilling (2" diameter borehole)	LF	312	$4.90	$1,529	$11.60	$3,619	$5,148
	(3).	Filter Pack	LF	24	$8.50	$204	$1.50	$36	$240
	(4).	Concrete Surface Pad	EA	12	$3.50	$42	$1.50	$18	$60
	(5).	Grout	LF	288	$1.11	$320	$0.00	$0	$320
	(6).	Bentonite Seal	EA	12	$25.00	$300	$6.00	$72	$372
	(7).	Drums for Well Cuttings	EA	12	$53.00	$636	$0.00	$0	$636
	(8).	Manhole Cover	EA	12	$78.00	$936	$26.82	$322	$1,258
	(9).	Well Casing (2" SS)	LF	288	$19.30	$5,558	$1.69	$487	$6,045
	(10).	Well Screen (2"SS)	LF	24	$44.32	$1,064	$1.43	$34	$1,098
	(11).	Move Drill Rig	EA	12	$25.84	$310	$13.40	$161	$471
	(12).	Decontamination	EA	1	$10.00	$10	$60.00	$60	$70
	(13).	Drum Disposal	EA	12	$0.00	$0	$325.00	$3,900	$3,900
(3).	SVE Well Drilling and Installation								
	(1).	Crew Per Diem Expenses	DY	3	$0.00	$0	$95.00	$285	$285
	(2).	Mud Drilling (4" diameter borehole)	LF	30	$6.40	$192	$12.30	$369	$561
	(3).	Filter Pack	LF	15	$14.74	$221	$2.15	$32	$253
	(4).	Concrete Surface Pad	EA	3	$11.70	$35	$2.80	$8	$44
	(5).	Grout	LF	15	$1.67	$25	$0.00	$0	$25
	(6).	Bentonite Seal	EA	3	$60.37	$181	$12.07	$36	$217
	(7).	Drums for Well Cuttings	EA	3	$53.00	$159	$0.00	$0	$159
	(8).	Manhole Cover	EA	3	$105.00	$315	$26.82	$80	$395
	(9).	Well Casing (4" PVC)	LF	15	$12.50	$188	$2.15	$32	$220
	(10).	Well Screen (4" PVC)	LF	15	$14.50	$218	$2.15	$32	$250
	(11).	Move Drill Rig	EA	3	$25.84	$78	$13.40	$40	$118
	(12).	Decontamination	EA	1	$10.00	$10	$60.00	$60	$70

(13).	Drum Disposal	EA	3	$0.00	$0	$325.00	$975	$975
(4).	Air Sparging Header Piping, Lateral Piping, Valves							
(1).	Header Piping (6-inch)	LF	900	$4.08	$3,672	$5.21	$4,689	$8,361
(2).	Lateral Piping (2-inch, 10 LF each well)	LF	120	$1.45	$174	$5.46	$655	$829
(3).	Trenching/Backfill/Compaction	LF	900	$0	$0	$5.50	$4,950	$4,950
(4).	Flow Monitoring Stations	EA	12	$100	$1,200	$20.00	$240	$1,440
(5).	Isolation Valves	EA	12	$65	$780	$16.56	$199	$979
(6).	Throttling valves	EA	12	$65	$780	$16.56	$199	$979
(5).	Air Sparging Blower and Accessories							
(1).	Blower (250 CFM @ 10 PSIG)	EA	1	$8,400	$8,400	$750	$750	$9,150
(2).	Suction and Discharge Piping (6-inch)	LS	1	$500	$500	$500	$500	$1,000
(3).	Electrical Terminations	LS	1	$200	$200	$500	$500	$700
(6).	Soil Vapor Extraction Header Piping, Lateral Piping, and Valves							
(1).	Header Piping (6-inch)	LF	900	$4.08	$3,672	$5.21	$4,689	$8,361
(2).	Lateral Piping (2-inch)	LF	30	$1.45	$44	$5.46	$164	$207
(3).	Trenching/Excavation/Backfill	LF	900	$0	$0	$5.50	$4,950	$4,950
(4).	Flow Monitoring Stations	EA	3	$100	$300	$20.00	$60	$360
(5).	Isolation Valves	EA	3	$65	$195	$16.56	$50	$245
(6).	Throttling valves	EA	3	$65	$195	$16.56	$50	$245
(7).	Soil Vapor Extraction Blower and Accessories							
(1).	Blower (400 CFM @ 60" w.c. vac)	EA	1	$13,200	$13,200	$235	$235	$13,435
(2).	Suction and Discharge Piping (6-inch)	LS	1	$500	$500	$500	$500	$1,000
(3).	Electrical Terminations	LS	1	$200	$200	$500	$500	$700
(8).	Enclosure							
(1).	Wood Sided Storage Garage	SF	80	$20	$1,600	$30	$2,400	$4,000
(2).	8" slab on grade	SF	80	$15.00	$1,200	$30	$1.75	$1,202
(3).	Signage	EA	10	$30.00	$300	$20.00	$200	$500

(9). Utilities

(1).	Electrical Service to Enclosure	LS	1	$500.00	$500	$1,500.00	$1,500	$2,000
	SUBTOTAL:				$50,600		$40,000	$90,600

SUBTOTAL:	$90,600
ENGINEERING:	$18,100
CONSTRUCTION MANAGEMENT:	$9,100
CONTINGENCIES:	$18,100
TOTAL (CAPITAL COSTS):	$135,900

ALTERNATIVE 2: MONITORING
ESTIMATED ANNUAL OPERATING COSTS

PROJECT:	Amphenol Corp. / Franklin Power Products
PROJECT NUMBER:	07026.08

Costs presented are for semi-annual monitoring of select VOCs in groundwater in Operable Area 3 for the Former Amphenol site. The following assumptions have been made:

(1). 4 monitoring wells will require sampling.
(2). Sampling will be done on a semi-annual basis for a total of 12 years.
(3). Water samples will be analyzed for TCE, TCA, and PCE only.

	Estimated Annual Cost
I. GROUNDWATER SAMPLING AND ANALYSIS	
A. Sample Collection (16 MH @ $50/MH)	$800
B. Sample Analysis (8 water samples, 3 analytes per sample, $135/sample)	$1,080
C. Assemble and Analyze Data (16 MH @ $80/MH)	$1,280
D. Report Development and Submittal (16 MH @ $80/MH)	$1,280
E. Expenses	
Travel/Mileage	$800
Miscellaneous	$200
	$5,440
Contingencies (20%):	$1,088
Total Estimated Operating Costs:	$6,528

ALTERNATIVE 3: MONITORING; GROUNDWATER EXTRACTION AND TREATMENT
ESTIMATED ANNUAL OPERATING COSTS

PROJECT:	Amphenol Corp. / Franklin Power Products
PROJECT NUMBER:	07026.08

Costs presented are for semi-annual monitoring of select VOCs in groundwater in Operable Area 3 for the Former Amphenol site and operation of a groundwater extraction system which uses the interim control air stripper.
The following assumptions have been made:

(1). 30 monitoring wells and two extraction wells will require sampling.
(2). Sampling will be done on a semi-annual basis for a total of 12 years.
(3). Water samples will be analyzed for TCE, TCA, and PCE only.
(4). The groundwater extraction system will operate continuously.
(5). The groundwater extraction system will include two extraction wells.
(6). The existing ICM air stripper is used for treatment of the extracted groundwater.
(7). This cost estimate includes only the incremental cost for adding the extraction wells and processing additional flow through the air stripper and does not include the baseline cost for operating the air stripper as the ICM.

			Estimated Annual Cost
I.	GROUNDWATER SAMPLING AND ANALYSIS		
	A.	Sample Collection (16 MH @ $50/MH)	$800
	B.	Sample Analysis (10 water samples, 3 analytes per sample, $135/sample)	$1,350
	C.	Assemble and Analyze Data (16 MH @ $80/MH)	$1,280
	D.	Report Development and Submittal (16 MH @ $80/MH)	$1,280
	E.	Expenses	
		Travel/Mileage	$400
		Miscellaneous	$200
II.	GROUNDWATER EXTRACTION AND TREATMENT SYSTEM OPERATIONS		
	A.	Electricity Costs (two 1/2 hp pumps @ $0.06/KWH)	$400
	B.	System Oversight (2 MH/wk @ $50/hr)	$5,200
	C.	General Parts and Maintenance	$1,000
	D.	Water Discharge to Sanitary Sewer (10gpm @ $2.81/1,000 gal.)	$14,800
		Estimated Operating Costs:	$26,700
		Contingencies (20%):	$5,340
		Total Estimated Operating Costs:	$32,040

ALTERNATIVE 4: MONITORING; AIR SPARGING WITH SVE
ESTIMATED ANNUAL OPERATING COSTS

PROJECT:	Amphenol Corp. / Franklin Power Products
PROJECT NUMBER:	07026.08

Costs presented are for semi-annual monitoring of select VOCs in groundwater in Operable Area 3 for the Former Amphenol site and operation of an air sparging/SVE system. The following assumptions have been made:

(1). 4 new monitoring wells will require sampling.
(2). Sampling will be done on a semi-annual basis for a total of 12 years.
(3). Water samples will be analyzed for TCE, TCA, and PCE only.
(4). Air sparging/SVE system will operate continuously.
(5). No air monitoring will be required during the air sparging/SVE operation

			Estimated Annual Cost
I.	GROUNDWATER SAMPLING AND ANALYSIS		
	A.	Sample Collection (16 MH @ $50/MH)	$800
	B.	Sample Analysis (8 water samples, 3 analytes per sample, $135/sample)	$1,080
	C.	Assemble and Analyze Data (16 MH @ $80/MH)	$1,280
	D.	Report Development and Submittal (16 MH @ $80/MH)	$1,280
	E.	Expenses	
		Travel/Mileage	$400
		Miscellaneous	$200
II.	AIR SPARGING AND SVE SYSTEM OPERATIONS		
	A.	Electricity Costs (25 hp blower, 20 hp vacuum pump @ $0.06/KWH)	$17,800
	B.	System Oversight (4 MH/wk @ $50/hr)	$10,400
	C.	General Parts and Maintenance	$3,000
	D.	General Performance Monitoring	$2,000
		Estimated Operating Costs:	$38,200
		Contingencies (20%):	$7,640
		Total Estimated Operating Costs:	$45,840

5010 Stone Mill Road, Bloomington, Indiana 47408

RECEIVED
OCT 16 1996
DIVISION FRONT OFFICE
Waste, Pesticides & Toxics Division
U.S. EPA – REGION 5

10/21/96 ofy to RCRA File

October 15, 1996

Mr. Paul Little (DRE-8J)
Chief, Waste, Pesticides and Toxics Division
Enforcement and Compliance Assurance Branch
USEPA, Region 5
77 West Jackson Boulevard
Chicago, IL 60604-3590

Re: Administrative Order on Consent (AOC) dated November 27, 1990
Franklin Power Products/Amphenol Corporation
Franklin, IN
IND 044 587 848

Telephone
812.336.0972
Facsimile
812.336.3991

Dear Mr. Little:

Attached, please find copies of a *Report of Additional Corrective Measures Studies for the Former Amphenol Facility, Franklin, Indiana* submitted on behalf of Respondents Franklin Power Products and Amphenol Corporation. The draft report was revised in accordance with your September 12, 1996 comment letter received by Amphenol on September 16, 1996, and a telephone conversation between Amphenol Corporation and a telephone conversation between Amphenol and USEPA representatives on October 8, 1996.

The revised report text is submitted in a form that underlines all additions to the text and strikes through all deletions. Tables 5.1, 5.2 and 5.3 were revised to reflect data on ICM performance received since the June 1996 draft report, and are included with the text. A copy of Sheet 4, which shows the positions of underground utility lines in Operable Area 3, is included as well. Upon the acceptance of the revisions by USEPA, a full report incorporating all revised text, figures, tables, sheets and appendixes will be assembled and copies sent in accordance with the mailing list in Section XVI the AOC, plus copies to Steve Acree at the USEPA Ada, OK laboratory, John Bonsett of the Johnson County Health Department and Rick Littleton of the Franklin Board of Public Works. We have addressed the General and Specific Comments in Attachment I of the September 12, 1996 letter as follows:

General Comment 1. The text has been revised.

EARTH TECH

Formerly WW Engineering & Science

General Comment 2. Sheet 1 was not revised, but Section 3.1.3 of the revised text discusses alternate interpretations of ground water flow direction south of MW-31 and Ross Court.

General Comment 3. The text of Section 3.7.6 is modified to indicate that different ground water sampling methods may lead to different analytical results. However, the paper cited by Mr. Acree (Chiang and others, 1995, see report Bibliography section) does not support the EPA suggestion that lower VOC concentrations might result from sampling a screened monitoring well versus sampling through a Geoprobe. The report indicates only that they might differ. The report recommends that continued ground water monitoring be undertaken in Operable Area 3 to verify the results of the previous analyses.

General Comment 4. This is discussed in Section 3.7.6. The term "natural attenuation" has been deleted from the text.

General Comments 5 and 6. Subsurface utility lines are addressed in Section 3.5 and Sheet 4. We believe that the density of buried utility lines (e.g., power to pumps and piping for recovered ground water) precludes the implementability of any corrective measure requiring the placement of buried service lines along Forsythe Street. If the service lines are laid above the utility lines, there is the potential for damage and/or service interruption to the system every time a utility line is unearthed for repair or upgrade. Laying the service lines beneath the utility lines will involve either trenching up to the vicinity of each utility line, then exposing them by hand digging, or by horizontal drilling, which is of limited use in granular materials such as exist in the subsurface along Forsythe Street. Our brief discussion of "well points" during the October 8 telephone conversation does not apply to Alternatives 3 or 4. There are few problems associated with the installation of recovery wells, or sparging or vapor extraction wells along Forsythe Street whether they are driven well points or drilled wells. The problems are associated with the service lines.

General Comment 7. A monitoring well (MW-35) can be installed in Operable Area 3 as part of the selected Corrective Measure for the site, but as we agreed in our October 8 telephone conversation, it should be installed in the vicinity of MW-34 rather than MW-32.

Installation of the monitoring well will follow the procedures employed during the RFI for MW-23 and MW-25, and will require the concurrence of the Franklin Board of Public Works.

General Comment 8. Stripper effluent was sampled on September, 1996 and analyzed for lead at a detection of 5 ug/l (ppb). Table 5.1 has been revised accordingly and the laboratory data sheets will be included in Appendix F of the revised report.

Specific Comment 1. The referenced text has been clarified.

Specific Comment 2. The text has been corrected.

Specific Comment 3. The statement on page 24 reads *There is no evidence that Hurricane Creek bottom sediments are acting as a "contaminant sink"*. We believe that the data provided in the approved RFI report support this statement.

We are continuing our sampling efforts to evaluate ground water conditions in the vicinity of Hurricane Creek. There is a layer of large cobbles of unknown thickness along the north bank of Hurricane Creek that has limited the penetration of a hand auger less than 3 feet. A second attempt will be made using driven stainless steel points to wedge between the cobbles.

An On Site Recovery System Evaluation Work Plan is being prepared in accordance with the September 12 letter and Attachment I, and will be submitted within 75 days of the date the letter was received by Amphenol.

If you have any questions or comments, please get in touch with Mr. Sam Waldo.

Very truly yours,
EARTH TECH
James H. Keith
James H. Keith
Project Manager

cc: Sam Waldo
William Buller
Michael Jarvis
Thomas Linson
Steve Acree

Amphenol

enol Corporation

d Headquarters
358 Hall Avenue
P.O. Box 5030
Wallingford, CT 06492
Telephone (203) 265-8900

To RCRA
file
6-27-96

June 14, 1996

Mr. Paul Little (DRE-8J)
Chief, Waste, Pesticides and Toxics Division
Enforcement and Compliance Assurance Branch
USEPA, Region 5
77 West Jackson Boulevard
Chicago, IL 60604-3590

Re: Administrative Order on Consent (AOC) dated November 27,1990
Franklin Power Products/Amphenol Corporation
Franklin, IN
IND 044 587 848

Dear Mr. Little:

Attached please find copies of a ***Report of Additional Corrective Measures Studies for the Former Amphenol Facility, Franklin, Indiana,*** prepared in accordance with the February 9, 1996 Work Plan as modified by your March 12, 1996 approval letter.

The report indicates that conditions along Forsythe Street have moderated significantly since the RFI sampling conducted during April 1994. Notwithstanding that, active remediation was fully evaluated in the alternatives analysis portion of the CMS. The recommended alternative is one of routine monitoring to confirm that conditions continue to improve along Forsythe Street.

In your March 12, 1996 letter, you also requested that Respondents submit an alternative plan to our June 14, 1994 Supplemental Work Plan to address conditions in the Hurricane Creek stream bed. As described in the work plan for the recently concluded CMS activities, Respondents have conducted several activities to further define and address EPA's concerns regarding Hurricane Creek. A description of those activities, and the conclusions drawn as a result of those activities, are presented in the attached report. In view of the inclusion of this presentation in the report, we have not presented a separate work plan. We recognize, however, that this evaluation did not include collection of samples for chemical analysis. To support the conclusions reached regarding Hurricane Creek, we continue to recommend that surface water sampling points be included in the performance monitoring network proposed as part of the corrective actions for this site.

In the September 1995 CMS Report, Respondents recommended corrective measures which incorporated institutional controls, monitoring of both on-site and off-site monitoring wells for selected VOCs (including proposed monitoring wells on Forsythe Street), as well as monitoring of on-site soils if necessary and continued operation of the ICM with the option to implement an air sparging/soil vapor extraction system should accumulated data from the ICM indicate the need to supplement VOC removal. The additional work described in the attached report further supports and confirms these conclusions.

Should you have any questions regarding the information included in this report, please contact me at (203)265-8760.

Sincerely,

Samuel S. Waldo
Director, Environmental Affairs

127.wpd

Report of a Corrective Measures Study for the Former Amphenol Facility Franklin, Indiana

Prepared for:

Amphenol Corporation
358 Hall Avenue
Wallingford, CT 06492

Franklin Power Products
400 Forsythe Street
Franklin, IN 46131

Prepared by:

EARTH TECH
5010 Stone Mill Road
Bloomington, Indiana 47408

September, 1995

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A	Figures, Tables and Sheets from Approved RFI Report
B	Corrective Measure Alternatives Capital Cost Estimates
C	Corrective Measure Alternatives Annual Operating Cost Estimates
D	Indiana State Regulations for Permitting of VOC Discharges

1.0 INTRODUCTION

This document presents the results of a Corrective Measures Study (CMS) for the former Amphenol facility located at 980 Hurricane Road, Franklin, Indiana. This report is submitted to U.S. EPA Region V in partial fulfillment of the requirements of a U.S. EPA Administrative Order on Consent (Consent Order), dated November 27, 1990, and directed to respondents Franklin Power Products, Inc., and Amphenol Corporation. Respondents are responsible for conducting a Resource Conservation and Recovery Act Facility Investigation (RFI) and a CMS.

In response to the Consent Order, an RFI was conducted by EARTH TECH (formerly WW Engineering and Science). The report documenting the RFI dated June 13, 1994 was approved by U.S. EPA Region V in a letter dated July 22, 1994. A CMS Work Plan was developed to address site specific contamination identified in the approved RFI report. The work plan was approved by U.S. EPA on November 28, 1994.

The material in the approved RFI report is incorporated into this Corrective Measures Study Report by reference. With the exception of Section 4.0, site features, sampling locations and references cited in this report are located and described in the approved RFI report. Copies of relevant figures, tables, and sheets from the approved RFI report are contained in Appendix A of this CMS report.

2.0 SITE HISTORY

Background information regarding the former Amphenol facility, and a summary of previous investigations are provided in this section.

2.1 LOCATION AND PHYSICAL SETTING

The former Amphenol facility covers an area of about 15 acres. It is located in part of the Northwest Quarter of the Northwest Quarter of Section 13, T.12N., R.4E., on the northeastern side of Franklin, Indiana (Figure 1, Appendix A). The property is bounded on the east by Hurricane Road, on the south by Hamilton Street, on the north by an abandoned rail line, and on the west and northwest by a Farm Bureau Co-Op facility and Arvin Industries, respectively. A Grimmer-Schmidt facility is located east of the site across Hurricane Road. To the south, southeast and southwest, the land use is primarily residential. Approximately 6 acres of the property is used by Franklin Power Products subsidiary companies for manufacturing purposes. The remainder of the property is leased for farming operations or maintained in grass. The site is relatively flat with approximate elevations ranging between 730 and 735 feet above Mean Sea Level (MSL).

The main structure on the site is a 46,000 square foot building formerly used in the manufacture and distribution of electrical components. The building is now occupied by International Fuel Systems, Inc., which manufactures fuel injectors for diesel engines, and Marine Corporation of America, which assembles marine diesel engines. Other buildings include a separate wastewater pretreatment building, now used for engine testing, and a small single-bay garage, used for storage. The area surrounding the main building is either paved parking area, driveway, or grass. The property is unfenced.

Surface drainage from a large area north of the property enters a 72-inch storm sewer at an infall located on the Arvin property immediately adjacent to the northwest corner of the property. The location of this storm sewer is shown on Figure 2 (Appendix A). The storm sewer lies along the western property boundary and receives additional flow from a sewer opening on Farm Bureau property located about 450 feet south of the northwest property corner. At the southwest property corner, the storm sewer turns east. Directly south of the main production building, the sewer turns south again and extends to Hamilton Avenue. At Hamilton Avenue, it again turns and runs east along the south property line. The storm sewer crosses under Hamilton Avenue in the extreme southeast corner of the property, and discharges to Hurricane Creek at a point approximately 1,200 feet southeast of the site. Hurricane Creek has a drainage area of about 15.6 square miles above the storm sewer outfall.

Surface drainage from the northern portion of the property enters a low, wide, natural swale that trends northeast-southwest across the property. This swale appears to be internally drained, and the direction of water flow is unknown. The southeastern portion of the property drains southeast to Hamilton Avenue and Hurricane Road, thence into a storm sewer manhole located in the inside of the roadway where Hamilton Avenue turns north into Hurricane Road.

2.2 PREVIOUS USE OF THE PROPERTY

The main manufacturing building on the site was built in 1961 by Dage Electric, Inc. for the manufacture of electric connectors. The operation was acquired in 1963 by Bendix Corporation for its Bendix Connector Operations plant. Processes included electroplating, machining, assembling and storing manufactured components, and inventorying raw materials and compounds required for production. Electroplating operations occurred in a room in the extreme southwestern portion of the building. From 1961 to 1981, wastewater from plating operations at the facility was discharged directly into a municipal sanitary sewer. The location of this old sanitary sewer is shown on Figure 2 (Appendix A).

In 1981, a wastewater pretreatment system was installed in a separate building for treatment of cyanide and chromium bearing wastewaters from the plating room. New wastewater lines were installed from the plating room to the pretreatment building, and the effluent from the pretreatment plant was routed to a sanitary sewer manhole just south of the main manufacturing building. In conjunction with the construction of the pretreatment building, a small addition was added to the southwest corner of the manufacturing building, adjacent to the plating room. This addition was evident from examination of historic aerial photographs dated 1976 and 1988. The space was utilized as a RCRA container storage area, and replaced a previous outdoor, fenced, hazardous waste storage area at this same location.

In 1983, the Bendix Corporation was acquired by Allied Corporation and merged with its Amphenol Products Division. As a result of consolidation efforts, manufacturing at the Franklin facility ceased in September, 1983, and the plant was closed at that time. Closure of RCRA units began in February, 1984, and is discussed in detail in Section 2.5.6 of this report.

In 1986, Amphenol Products Division became the Amphenol Corporation, and in 1987 it was sold and become a wholly owned subsidiary of LPL Investment Group, Inc. Amphenol sold the facility to Franklin Power Products, Inc. on June 15, 1989.

2.3 GEOLOGIC SETTING

The area is located within the Tipton Till Plain physiographic unit of Malott (1922) which is generally characterized by low relief topography underlain by thick deposits of glacial drift. The surficial drift deposits are Wisconsinan (Woodfordian) in age and consist primarily of loamy textured diamicts (glacial till) as well as stratified sand and gravel deposits. In many places, older glacial drift deposits of pre-Wisconsinan age have been identified.

Four lithostratigraphic units may be recognized in the upper portion of the glacial drift sequence. Previous soil borings conducted during the period 1984 to 1985 suggest the site is underlain by a thin veneer of weathered glacial till about five to eight feet thick (identified as Unit A in this report) which overlies a sand or silty sand deposit (Unit B) which is saturated in the lower part. The bottom of this sand unit occurs at 712 to 715 feet MSL, or approximately 20 feet below ground surface. The sand overlies a hard, dense till unit 23 to 26 feet in thickness (Unit C), which in turn overlies a second sand unit that is approximately 17 to 20 feet in thickness (Unit D). The bottom of the lower sand unit extends to a depth of about 60 feet below ground surface. Both the lower part of Unit B and Unit D are saturated and yield groundwater.

Deeper drift deposits are known from only one boring (MW-13), but appear to consist primarily of till, with thin stratified units occurring at depths of 114.5, 122 and 172 feet. The lowest "basal sand" unit directly overlies shale bedrock. Bedrock beneath the property is the Devonian-Mississippian aged New Albany Shale (Gray and others, 1987), encountered at a depth of 178.9 feet in boring MW-13.

2.4 HYDROGEOLOGY

Previous water level elevation data from site monitoring wells suggest a fairly uniform north to south groundwater flow gradient within the upper sand and gravel unit. Data gathered by International Technology Corporation (IT) on May 3, 1985 suggest that the 72-inch storm sewer flowing along the south boundary of the property may act at least as a partial intercept for groundwater flow in the saturated portion of Unit B. The water level in well IT-2, located south of the storm sewer, was reported to be over 1.2 feet higher than MW-12 located adjacent to, and north of the sewer. These levels suggest a local reversal of the north to south hydraulic gradient in the storm sewer area.

Hydraulic conductivity of the upper sand unit (Unit B) was estimated by IT from six in situ "slug" tests conducted in the old ATEC Associates (ATEC) monitoring wells (IT, 1985). Calculated values ranged from 3.08×10^{-6} to 9.51×10^{-4} cm/sec. Results may be biased low due to poor well construction, and/or development.

2.5 PREVIOUS INVESTIGATION AND REMEDIAL RESPONSE

2.5.1 HYDROGEOLOGIC INVESTIGATIONS BY ATEC, 1984

A hydrogeologic investigation of the facility was initiated in February, 1984 by Allied Corporation concurrent with plant closure activities, and in anticipation of the sale of the property. The investigation entailed the collection and analysis of soil samples and groundwater samples for volatile and semi-volatile organic compounds, pesticides/PCBs, EP TOX metals and cyanide.

A total of 10 volatile organic compounds (VOCs) were detected in groundwater. Concentrations of tetrachloroethene (PCE) and trichloroethene (TCE) up to several thousand micrograms per liter (ug/l) were detected in wells adjacent to the main facility building, particularly along the southwest corner adjacent to the plating room. The presence of the VOC contamination was confirmed by the analysis of the soil boring and hand auger samples. Lateral groundwater flow direction was determined to be to the south based on water levels from the initial well network. TCE (1,040 ug/l), PCE (611 ug/l) and toluene (5.4 ug/l) were detected in an upgradient monitoring well.

ATEC continued the facility investigation in June, 1984. Twelve additional wells, including a four-well cluster, were installed. These wells were installed to intersect the uppermost sand aquifer as well as deeper units. VOCs, principally PCE, TCE, and 1,1,1-trichloroethane (TCA), were detected at all well locations except A-9 (MW-9 in the approved RFI report). Contamination at upgradient monitoring well A-4 was confirmed, and substantial PCE and TCE concentrations were also found at upgradient locations A-7 (600 and 430 μg/l) and A-8 (835 and 870 μg/l). A VOC concentration of 27,000 ug/l of TCA was found at well A-12 (MW-12 in the approved RFI report) located along a sanitary sewer downgradient from the facility.

2.5.2 SANITARY SEWER LINE

In July, 1984 ATEC conducted a video camera inspection of the sanitary sewer line leading south from the plant. The sewer was determined to be eight inch vitrified clay tile and was found to have numerous separated joints. Crushed tiles, an offset pipe joint, and an apparent PVC patch were found in an area 157 to 176 feet north of a manhole along Hamilton Avenue. This area corresponds with the location where the 72-inch storm sewer crosses under the sanitary line. Examination of historic aerial photographs suggest that the storm sewer was installed shortly before August, 1976.

2.5.3 PLATING ROOM INVESTIGATION, 1984

In August 1984, ATEC conducted an investigation of soils beneath the plating room floor at the southwestern corner of the facility. Samples were analyzed for VOCs and cyanide. Soils were found to be contaminated with cyanide and certain VOCs, primarily PCE and TCE. Recommendations provided for removal of 15 to 20 cubic yards of soil to a secure landfill.

2.5.4 HYDROGEOLOGIC INVESTIGATIONS BY IT, 1985

Beginning in February 1985, Allied began a second hydrogeologic investigation of the facility utilizing International Technologies Corporation (IT) as a consultant. This study was conducted because of possible deficiencies and inconsistencies in the ATEC investigations, and the need to develop a more comprehensive characterization of groundwater flow, groundwater quality and contaminant transport on and near the property.

Phase I of the IT investigation involved development and sampling of the previously installed ATEC wells, and the collection of several surface water and storm sewer samples. Samples were analyzed for metals, VOCs and total cyanide. A variety of VOCs were detected in all 16 groundwater samples analyzed. However, markedly lower levels of contaminants were detected in upgradient monitoring wells 4, 7 and 8 than were reported by ATEC. IT noted that the greatest levels of contaminants appeared to be concentrated in the area south of the former plating room, and extended at least as far as the storm sewer along the south boundary of the property.

Samples of the storm sewer discharge showed elevated levels of several VOCs, principally TCE, PCE and TCA downstream from the plating room area. A sample from the storm sewer manhole nearest the plating room contained these contaminants at levels comparable to upstream sampling points. The data suggested that the storm sewer acted as a groundwater intercept, and that contaminated groundwater from the facility was entering the storm drainage system. Most probably this occurred in the area south of the plant where the storm sewer parallels the sanitary sewer for a distance of about 150 feet, and where numerous sewer defects were noted during the July, 1984 video camera inspection (Section 2.3.2 of the approved RFI report).

VOCs were also found in Hurricane Creek at the storm sewer outfall, and at a point downstream in Hurricane Creek. No VOCs were detected in a sample from Hurricane Creek upstream from the storm sewer outfall.

Additional monitoring wells were installed by IT in April, 1985. The purposes of the new well installations were to:

- determine if the storm sewer or pipe-bed acted as an intercept to off-site contaminant migration;
- determine if any contamination existed in the deeper sand units, notwithstanding previous ATEC results which were attributed to poor well construction;
- determine the type and extent of organic contaminants present in the soil adjacent to the plating room, and to determine if they are affecting groundwater quality;
- determine if any contaminants were migrating east or northeast from the facility which could possibly affect the Franklin municipal well field.

A total of 27 soil borings were made along the west and south sides of the former plating room. Samples for each boring were obtained at a 6- to 7.5-foot depth, or at the approximate depth of the former sanitary sewer line leaving the plating room area. Based on February, 1985 sampling results, soil and water samples were analyzed for priority VOCs and certain non-priority VOCs.

Samples from the six new monitoring wells (IT-1A, 1B, 2, 3, 4 and 5) were obtained by IT in May, 1985. In shallow groundwater, the priority pollutant VOCs detected were limited to 1,1-dichloroethane (DCA), toluene, TCA, and TCE. Only toluene at 9.1 µg/l, TCA at 2.2 µg/l, and xylenes at 2.2 µg/l were detected in Unit D water at a 60 foot depth at IT-1A. Wells IT-2 and IT-3, located south of the storm drain were found to contain TCE, TCA, and toluene. No VOCs were detected in IT-4, and IT-5 was found to contain toluene at only 1.6 µg/l. IT concluded that the storm drain along the south boundary of the property was acting as at least a partial groundwater intercept (Figure 6, Appendix A). Based on their 1985 data, IT produced several isoconcentration maps which show the influence of the storm and sanitary sewers on the extent of groundwater contamination in the shallow sand unit. These data are tabulated in a final report (IT, 1985).

A total of 11 samples from the plating room borings were analyzed for VOCs. Acetone, benzene, chloroform, 1,1,2,2-tetrachloroethane, TCA and TCE were detected. No large amounts of contaminants were detected, and total VOC content was everywhere less than 3 ppm.

2.5.5 QUARTERLY MONITORING

Allied/Amphenol submitted a groundwater monitoring plan to the Indiana State Board of Health on September 12, 1985. The plan, prepared by IT, established a quarterly groundwater monitoring program to be conducted for a period of one year. The program was implemented in February 1986, and was conducted through November 1986. Samples from wells IT-1A, IT-2, IT-3, MW-3, MW-9 and MW-12, as well as the storm sewer outfall were analyzed for VOCs. Results were generally similar to the 1985 testing. Of note are values from the upgradient well (MW-9) which showed concentrations for PCE, TCE and TCA above detection levels for multiple sampling periods, and the continuing detection of VOCs, including PCE, TCE and TCA, in the storm sewer outfall at Hurricane Creek.

2.5.6 CLOSURE AND CORRECTIVE MEASURES ACTIVITIES

The following closure and corrective measures activities were conducted at the Amphenol facility in response to the previously described investigations:

- Removed and disposed of the plating room floor and underlying soil to a depth of nine feet, treated the excavation with sodium hydroxide and installed clean backfill and a new concrete floor;

- Disconnected and plugged the old sanitary sewer line and replaced it with a new line offset 35 feet east of the old one;

- Drained and treated fluids from the wastewater treatment system, the plating room tanks and other areas in the plating room;

- Drained and treated liquid from the underground cyanide overflow tank, and capped the pipes at the discharge end; and

- Removed twelve previously installed groundwater monitoring wells and grouted the boreholes to the surface.

In response to an Indiana Department of Environmental Management (IDEM) Notice of Violation dated June 25, 1987, Amphenol filed a total closure plan dated August 10, 1987, and as per IDEM review amended this plan on March 13, 1989. The plan addressed closure of a container storage area (ID No. S01) and the cyanide tank (ID No. S02). Certification of Closure for these units was provided by Amphenol on April 2, 1990. The IDEM notified Amphenol on June 13, 1990 that total closure had been completed as per the requirements of 329 IAC 3-21.

2.5.7 RFI ACTIVITIES

On November 27, 1990, an Administrative Order on Consent (Consent Order) was signed by respondents Franklin Power Products and Amphenol Corporation. The field activities portion of a Quality Assurance Project Plan (QAPjP) prepared by WW Engineering & Science was approved on May 25, 1991. The laboratory portion was approved in December, 1991. RFI field activities began in January 1992. All work was performed in accordance with the approved RFI Work Plan as modified by the Consent Order.

2.5.7.1 Initial Investigation

The initial scope of investigation for this RFI is provided in a RCRA Facility Investigation Work Plan and Quality Assurance Plan developed by IT (1988), which was made a part of, and in part modified by, the Consent Order. Specific objectives of the RFI, as outlined in the QAPjP were as follows:

- Determine to what extent hazardous organic and inorganic constituents are present in the soil, the soil gas, and groundwater beneath the site;

- Determine to what extent data gathered during previous 1984 to 1986 sampling efforts are a valid indication of the extent of contamination;

- Determine the identity, concentrations and possible sources of groundwater contaminants entering the facility property from an upgradient direction, and their contributions to background levels;

- Determine the extent of, and direction and rate of movement of any contaminant plume that has resulted from the release of contaminants on the property;

- Determine whether any plume that exists has left the site boundaries;

- Characterize contaminant pathways; and

- Determine the identity and characteristics of any target populations or natural systems in the vicinity of the Amphenol facility.

To meet these objectives, samples were obtained from surface waters and sediments in local streams and storm sewers, soil materials collected from soil borings, soil gas, and groundwater from monitoring wells on and adjacent to the site. The first round of site work was conducted between January 28 and April 16, 1992. Soil and water samples were analyzed for VOCs, metals and total and amenable cyanide.

2.5.7.2 Second Round Activities

Analytical data obtained from the first round of samples indicated that additional sampling would be necessary to meet the objectives of the RFI. A technical memorandum describing activities and results of the first phase of the RFI, dated June 23, 1992, was submitted to Region V, U.S. EPA. The memorandum (Appendix B in the approved RFI report), listed the following objectives for additional RFI work:

- Evaluation of a potential separate PCE groundwater plume at the southwest corner of the facility parking lot;
- Additional sampling points to delineate the plume boundary in Unit B south of the storm sewer (off-site);
- Evaluation of the storm sewer and storm sewer trench as a possible pathway for contaminant migration, and delineation of any plume extension along the storm sewer;
- Evaluation of groundwater flow patterns and contaminants in storm sewer water during periods when groundwater levels are above the bottom of the storm sewer;
- Evaluation of possible sources of contamination to Unit D, perhaps utilizing additional well purging and sample analysis; and
- Evaluation of Unit B thickness south of the site.

To meet these objectives, additional soil, surface water and groundwater samples were collected both on- and off-site in accordance with an EPA-approved Work Plan dated October 12, 1992, and a supplement to that Work Plan, dated December 28, 1992. Additional sampling of selected monitoring wells and surface water took place on July 27, 1992. Additional soil boring, monitoring well installation, soil sampling and well purging activities were conducted between January 13 and February 17, 1993. On-site and off-site surface and groundwater sampling was performed between February 16 and March 2, 1993. Off-site work was performed with a hydraulic Geoprobe apparatus in lieu of permanent monitoring well construction, in accordance with the December 28, 1992 Work Plan supplement.

2.5.7.3 Third Round Activities

Upon review of additional information provided by the second round of sampling activities, Region V, U.S. EPA required the following additional information:

- An ecological risk assessment for the VOC releases into Hurricane Creek;
- Additional soils and groundwater sampling along Forsythe Street; and
- Development of a sampling plan to sample water below the bed of Hurricane Creek during zero flow conditions.

The additional sampling was accomplished in April, 1994. The draft RFI report with the new submittals was approved by Region V, U.S. EPA on July 22, 1994.

3.0 SIGNIFICANT FINDINGS OF THE RFI

This section summarizes significant findings of the RFI pertaining to contamination identified in soil gas, soil borings, groundwater, surface water and surface sediments. The approved RFI report dated June 13, 1994 should be referenced for specific information, data, and complete discussions of the items summarized here.

3.1 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Applicable or Relevant and Appropriate Requirements (ARARs) have been established for soil, surface sediment, surface water and groundwater and are summarized in Table 11 (Appendix A). ARARs for soil and surface sediment are calculated Preliminary Remediation Goals (PRGs). ARARs for waters are PRGs, Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and MCL Goals (MCLGs). Specific site contamination exceeding ARARs and identified in the RFI are discussed below.

3.2 SOIL GAS

A soil gas survey was conducted at the site in January 1992. The objectives of the survey were to provide a preliminary assessment of the extent of VOC contamination at the site and to investigate residual soil contamination in product/waste areas near the sewer lines. Results of the soil gas survey were presented to Region V, U.S. EPA in a technical memorandum dated April 8, 1992 and included as Appendix G in the approved RFI report. Evaluation of the soil gas data resulted in the delineation of two VOC plumes at the site (Figures 5 and 6, Appendix G of the approved RFI report). Maximum VOC concentrations in soil gas were found near that location where the storm sewer crosses under the old sanitary sewer. Decreasing

VOC concentrations in all directions from the sewer line suggested that the sewer was a line source for contaminant release. A separate PCE plume was detected in soil gas at the southwest corner of the facility parking lot. It was suggested in the soil gas technical memorandum that this plume may be the result of a surface-release of PCE at or near the southwest corner of the pavement.

3.3 SOIL BORINGS

Soil samples were collected from monitoring well borings and soil borings installed around the former Amphenol facility. Analyses were performed for VOC and inorganic parameters. Analytical results are shown in Table 3 (Appendix A). Sample locations are shown on Sheet 3 (Appendix A).

3.3.1 INORGANICS AND METALS

Four metals (arsenic, beryllium, manganese and cobalt) were consistently reported at levels exceeding ARARs. However, all concentrations were well within background ranges for soils in the area.

3.3.2 VOLATILE ORGANIC COMPOUNDS

VOCs were not detected above ARARs in upgradient soils. However, VOCs were detected above ARARs in the vicinity of the plating room and at depth in the vicinity of the sanitary sewer line. The areal extent of VOC contamination in soils is shown in Sheets 5A and 5B (Appendix A). Sheet 5A shows total VOC concentration in soil samples collected between 0 and 12 feet below the surface. VOC concentrations in this interval are concentrated along the storm sewer and old sanitary sewer. Sheet 5B shows total VOCs in soil samples from below 12 feet below the surface. VOC soil concentrations are much higher below 12 feet, at the approximate level of the top of the saturated zone. Peak concentrations are again centered over the sanitary sewer and storm sewer, but are more widespread, and are perhaps influenced by groundwater movement. Soil samples collected above the level of the sanitary sewer did not generally contain VOCs.

PCE was detected in soils near the former plating room at concentrations exceeding the ARAR for this compound. The presence of VOCs in this area are attributed to residual contamination from the former plating room.

PCE was detected along the sewer lines south of the former Amphenol facility at concentrations exceeding the ARAR in samples taken at the top of the saturated zone, but VOCs were not detected at concentrations that exceed ARARs at shallower depths. The presence of PCE in saturated soil at depth, beneath relatively uncontaminated, unsaturated soil indicated that PCE has migrated laterally through the soil to this area most likely carried in the groundwater.

PCE was detected at concentrations well above the ARAR in shallow soil samples taken at the southwest corner of the site. PCE was also detected in a deeper sample, but at a concentration below the ARAR.

3.4 GROUNDWATER

Groundwater quality was determined by collecting samples from permanent monitoring wells on-site and from temporary sampling points established both on- and off-site with the Geoprobe apparatus. Analyses were performed for VOCs, inorganics, and Appendix IX parameters. Analytical results are shown in Table 8 (Appendix A). Sample locations are shown on Sheet 3 (Appendix A).

3.4.1 UPGRADIENT SHALLOW AQUIFER

Groundwater quality in the upgradient portion of the shallow (Unit B) aquifer was evaluated by analyzing samples collected from monitoring wells MW-9, MW-20 and MW-26.

Concentrations of aluminum, beryllium, cobalt, iron, lead and manganese in upgradient groundwater were reported at levels exceeding the ARARs for these elements. These samples were collected unfiltered. Analyses of cobalt and lead indicate that filtration of these samples reduced the concentrations of these elements to below detectable limits. This suggests that element concentrations in excess of ARARs at the upgradient wells are derived from suspended solids (from native soil) in the unfiltered samples.

TCA (9 µg/l) and TCE (2 µg/l, estimated) were detected in upgradient monitoring well MW-9. The presence of VOCs in groundwater upgradient of the site had been reported from previous investigations. As specified in the Consent Order, the VOC concentrations reported in the upgradient wells are adopted as background levels for VOCs for the purpose of delineating the groundwater VOC plume at this site.

3.4.2 PLATING ROOM

Groundwater conditions in the vicinity of the former plating room were assessed through analysis of groundwater samples collected from monitoring wells MW-3 and MW-21. Samples were collected for VOCs, total metals, total cyanide and amenable cyanide.

Concentrations of six metals and two VOCs in groundwater exceeded ARARs. VOCs in groundwater at MW-3 and MW-21 are attributed to residual contamination associated with the former plating room. Of the six metals, arsenic is reported at a concentration below the regulatory MCL, and the remaining five (aluminum, cobalt, iron, lead and manganese), while present at levels greater than their respective ARARs, are considered to be normal background levels.

3.4.3 SEWER LINES

Groundwater quality in the vicinity of the storm and sanitary sewer lines was evaluated by analyzing samples collected from monitoring wells MW-12, MW-22, MW-30, IT-2, and IT-3.

PCE, TCA, and TCE were consistently detected in wells along the sewer lines at concentrations exceeding ARARs or site background levels. These data indicate that groundwater in the vicinity of the storm sewer has been impacted by VOCs. The highest concentrations were recorded in samples from MW-12 and MW-22, suggesting that the damaged old sanitary sewer was a primary source of VOC releases.

3.4.4 SOUTHWEST PARKING LOT CORNER

Groundwater quality beneath the southwest corner of the facility was assessed by analyzing samples collected from monitoring wells MW-27, MW-28 and MW-29.

PCE was detected at concentrations in excess of the ARAR in all three wells. Elevated TCE levels were reported at MW-28 and MW-29. TCA at MW-28 exceeded the ARAR, and at MW-27 and MW-29, TCA concentrations exceeded site background levels. PCE concentrations decrease from MW-27, toward MW-28 and MW-29. The PCE at the southwest parking lot corner is located upgradient of the contaminant plume centered on the sanitary sewer line failure.

3.4.5 OFF-SITE GEOPROBE SAMPLES

Groundwater quality south of the former Amphenol site was investigated by analysis of groundwater samples collected from the Unit B aquifer with a Geoprobe unit. Samples were obtained from points PGP-1 through PGP-4, and PGP-6 through PGP-18.

VOCs were reported at concentrations exceeding ARARs at PGP-4S, -4D, -6, -7, -8, and -9. Concentrations of TCA exceeding background were reported at PGP-6 through -10. Concentrations of 1,2-DCE exceeding background were reported at PGP-6. Locations PGP-4S and PGP-4D correspond to the upper and lower portions, respectively, of the saturated zone at MW-12. Samples were collected from PGP-4S and PGP-4D to compare with results of samples from MW-12.

Elevated levels of VOCs at PGP-3, -6, -7, -8, -9 and -10 indicate VOCs may have migrated south from the site along a line approximated by the location of Forsythe Street. The most likely avenue for this pattern of migration is a municipal sanitary sewer lying directly beneath Forsythe Street.

3.4.6 UNIT D AQUIFER

Groundwater quality in the deep (Unit D) aquifer was assessed by analyzing samples collected from monitoring wells MW-23, MW-25, and IT-1A.

Volatile organic compounds PCE and TCE were detected during sampling round one at concentrations exceeding ARARs and site background levels. Results of sampling collected during round three, after extensive well purging, indicate generally reduced VOC levels. The only confirmed detection was TCE at MW-25, reported at 11 µg/l. Other results were either estimated (13 µg/l, MW-23) or reported as not-detected. These results suggest that VOCs in Unit D are present as a result of carry down during previous well installation, and are not an indication of general aquifer contamination.

3.5 SURFACE WATER AND SURFACE SEDIMENT

Surface water and surface sediment conditions were investigated by analyzing samples collected from five locations around the site (Figure 9, Appendix A). Concentrations of arsenic, beryllium and cobalt are reported above ARARs for those metals. However, all concentrations are within background ranges and are therefore interpreted as naturally-occurring. Samples collected during the first round of surface sampling, conducted in February 1992, contained no elevated levels of VOCs or cyanide. Samples were collected from surface water sampling point SW-02 again in July 1992 (round two) and February 1993 (round three). Results from the July 1992 sampling reveal elevated levels of arsenic, beryllium, PCE, TCA and TCE. Arsenic and beryllium are derived from the dissolution of soils and sediments containing these elements. PCE, TCA and TCE are likely present as the result of the storm sewer acting as a groundwater intercept, transmitting groundwater from the site during periods of relatively high groundwater levels.

3.6 CONTAMINANT PLUME DELINEATION

Contaminant plume delineation was performed based on groundwater analytical data. Isoconcentration maps for DCA, PCE, TCA, and TCE in groundwater samples collected in March, 1993 are shown in Sheets 6A, 6B, 6C, and 6D (Appendix A), respectively. An isoconcentration map for total VOCs in groundwater is shown in Sheet 6E (Appendix A).

3.6.1 UNIT B AQUIFER

DCA was not detected above 5 µg/l north of the facility. The ARAR for DCA is 1010 µg/l. Plume delineation (Sheet 6A, Appendix A) is based on the non-detect level of 5 µg/l. DCA concentrations in excess of 5 µg/l in groundwater were consistently found along the sewer lines. The elongation of the isoconcentration contours eastward along the south edge of the site suggests that DCA has been carried along the storm sewer alignment. Similar elongation of the plume southward from the site along Forsythe Street indicates the municipal sanitary sewer may have acted as a secondary source of DCA contamination of groundwater in this area.

The ARAR for PCE is 1.4 µg/l. PCE was detected in upgradient monitoring well MW-26 at 3 µg/l. Plume delineation was accomplished using 3 µg/l as a background level of PCE at the site (Sheet 6B, Appendix A). PCE concentrations in excess of 3 µg/l were found west and south of the facility, roughly following the storm sewer and sanitary sewer lines, and off the southwest corner of the parking lot. Off-site PCE groundwater impacts are indicated at PGP-8 and IT-2.

TCA was detected in upgradient monitoring well MW-9 at 9 µg/l. The ARAR for TCA is 200 µg/l. A site background value of 9 µg/l for TCE was adopted for plume delineation (Sheet 6C, Appendix A). Elevated TCA concentrations were observed in groundwater south of the facility extending from the southwest parking lot corner eastward and southward along the sewer lines. Concentrations exceeding site background were observed off-site to the east and south along Forsythe Street. Concentrations exceeding background at PGP-6, -7, and -13 are upgradient from, and probably not related to, the plume from the former Amphenol site.

TCE was detected at 2 µg/l in upgradient monitoring well MW-9. The ARAR is 1.43 µg/l. Plume delineation was performed using 2 ug/l as the background TCE concentration at the site (Sheet 6D, Appendix A). Elevated TCE concentrations south and southeast of the site indicate that the storm sewer and sanitary sewer may have acted as migration pathways. Local exceedances at PGP-6 and -7 are upgradient from, and probably not related to, the former Amphenol site.

3.6.2 STORM SEWER

The potential for the storm sewer to act as preferential path for contaminant migration to Hurricane Creek was evaluated by monitoring water levels and collecting water samples during periods of relatively high and relatively low groundwater levels.

During groundwater sampling round one, groundwater levels were found to be below the level of the storm sewer invert. Surface water samples collected from the storm sewer outfall during sampling round one contained no VOC or cyanide concentrations above detectable limits, substantiating the interpretation that the storm sewer was not acting as a groundwater intercept at that time. During groundwater sampling rounds two and three, groundwater levels were found at elevations above that of the storm sewer invert, and water levels recorded in the storm sewer during sampling round two were below the elevation of the groundwater. Water samples collected from the storm sewer outfall during sampling rounds two and three contained detectable levels of PCE, TCA and TCE. These detections indicate that the storm sewer is intercepting groundwater beneath the site and transmitting it to the outfall at surface water sampling point SW-02 and then to Hurricane Creek.

3.6.3 SANITARY SEWER

A municipal sanitary sewer exists beneath the site and off-site to the south. City of Franklin personnel reported that the off-site portion of the sewer from the site to just north of the entry to Ross Court is 8-inch Vitrified Clay Pipe (VCP) with tarred joints, enlarging to 12-inch VCP at the point where a separate sewer line enters from the Glendale Addition. The sewer pipe is reportedly 7 to 8 feet below the ground surface.

VOCs detected in groundwater south of the site along Forsythe Street suggest that the sanitary sewer has acted as a secondary contamination source. Sheets 6A, 6C and 6D (Appendix A) show DCA, TCA and TCE plumes, respectively, extending to sampling point PGP-9.

3.7 RISK ASSESSMENTS

3.7.1 QUALITATIVE RISK ASSESSMENT

The Qualitative Risk Assessment performed for the RFI indicates that potentially hazardous chemicals are present in environmental media at the former Amphenol site, both on-site and off-site to the south. The results of the groundwater portion of the RFI indicate that contaminant levels on-site and off-site are at steady state or decreasing. Potentially significant exposures to those contaminants in groundwater and soil are limited due to their subsurface location and the lack of use of groundwater for drinking on and near the site. Based on risk calculations, exposures to contaminated surface water by children playing at the storm sewer outlet into Hurricane Creek were determined to not result in unacceptable risk.

Based upon the results of the RFI, the former Amphenol site does not pose an unacceptable risk to human health and the environment under current conditions but may pose a risk at some time in the future. It was recommended that periodic monitoring of on-site and off-site conditions be undertaken as a follow-up to the RFI.

3.7.2 ECOLOGICAL RISK ASSESSMENT

The Ecological Risk Assessment performed as part of the RFI indicates that VOC compounds of potential concern are being introduced into Hurricane Creek from the former Amphenol site via the storm drain outfall. VOCs have been measured in the outfall water from 1985 through 1992. During this period, the compounds carbon disulfide, 1,1-DCA, 1,2-DCA, 1,1-DCE, 1,1,1-TCA, 1,1,2-TCA, PCE and TCE have been measured above detection limits. Neither cyanides nor significant levels of metals have been detected in the outfall water. The target populations consist of aquatic organisms, primarily small fishes, crayfish and aquatic macroinvertebrates. No fish kills or environmental incidents attributable to the former Amphenol site have been documented in or along Hurricane Creek. None of the compounds in question is expected to bioaccumulate to a significant degree. Comparison of maximum values of VOCs in the outfall water with LOEL values and published results of exposure of freshwater fishes to the compounds indicates a single instance in May 1986 when the chronic LOEL for PCE was exceeded.

Based upon the results of this Ecological Risk Assessment, the effects on the fishes, crayfish and aquatic macroinvertebrates from VOCs introduced into Hurricane Creek from the former Amphenol site via the storm drain outfall are minimal now and have been minimal in the past. Site remediation activities will eliminate any potential future effects on the aquatic fauna of Hurricane Creek.

3.8 SUMMARY

Past disposal practices at the former Amphenol site involved the disposal of chlorinated solvents to the sanitary sewer. Leaking joints in the VCP sanitary sewer, and a failure of the sewer where it crosses over a 72-inch storm sewer line caused chlorinated solvents to be released into the environment. A new sanitary sewer line was constructed and the old sewer line was capped at either end and abandoned in place. Chlorinated solvents, principally 1,1,1-TCA, TCE and PCE, have been detected in a 3-foot thick saturated zone at a depth of approximately 15 feet. This saturated layer is separated from the lower aquifer by approximately 25 feet of dense clay till. The center of the contamination is approximately at the location of the sanitary sewer line failure. There is a secondary area of contamination at the southwest corner of the back parking lot, possibly from surface dumping of chlorinated solvents. This area is upgradient from the previously mentioned center of contamination.

During periods of high groundwater level the 72-inch storm sewer intercepts the saturated zone on the site and VOC contaminated water is delivered to Hurricane Creek. However, there does not appear to be a zone of contamination along the storm sewer off site.

Metals concentrations in the groundwater and soil were all consistent with background concentrations and are not considered to impact the site. Cyanide concentrations in groundwater and soils were all below ARARs and do not require further action.

VOC contamination is present in soil between the level of the sanitary sewer and the bottom of Unit B. The contamination is centered on the sanitary sewer break, but is generally present in the southwest corner of the facility property.

4.0 INTERIM CORRECTIVE MEASURE

4.1 BACKGROUND

Based on the results of the RFI and with the concurrence of U.S. EPA, respondents initiated the design and implementation of an interim corrective measure (ICM) in August 1994. The purpose of the ICM is twofold. First, groundwater remediation is being implemented using a pump-and-treat system. Second, the pumping is being utilized to depress the potentiometric surface in Unit B to a level below the storm sewer invert, thereby halting the release of VOC constituents to the storm sewer and ultimately to Hurricane Creek. The ICM system was installed by Wehran EMCON Northeast, Indianapolis, Indiana, and began operations the second week of February 1995.

4.2 SYSTEM INFORMATION

The ICM consists of three four-inch recovery wells (Figure 4-1) equipped with 5-foot lengths of slotted Schedule 40 PVC screens. RW-1 is located at the southeast corner of the property near RFI well MW-30 and is 18.0 feet deep. The screen interval is 11 to 16 feet. RW-2 is located near RFI wells MW-12 and MW-25 and is 21.5 feet deep. The screen interval is 14 to 19 feet. RW-3 is located near RFI wells MW-22 and MW-23, and is 23.5 feet deep. The screen interval is 16 to 21 feet. Each well is fitted with a submersible pneumatic pump with a capacity of 10 gallons per minute (gpm) for a maximum flow rate of 30 gpm. Average aggregate flow rates are expected to range from 15 to 20 gpm. All pumps are operated from an air compressor located in an air stripper building constructed for the ICM. Pneumatic pump controls for RW-1 are located in a covered pit at the wellhead. Pneumatic pump controls for RW-2 and RW-3 are located in the air stripper building. Pneumatic lines to the pumps are housed within 4-inch PVC casings that extend from the air stripper building to each well head.

Water is pumped from the recovery wells to the air stripper building underground through 1.5-inch flexible chemical resistant tubing inside the 4-inch PVC casings. A shut-off valve, sampling port and totalizing flowmeter for each influent supply line is located at the point where the lines enter the air stripper building. Each port and flowmeter is located immediately downstream of each shut-off valve. Influent flows are combined within the building and are directed to the top of a three-tray low profile air stripper with a rated capacity of 50 gpm. A regenerative 5 horsepower (HP) blower with a capacity of 400 cubic feet per minute (cfm) forces air upward from the bottom of the stripper unit to establish a counterflow with the downward-flowing water. Air exhausts from the stripper through an 8-inch polyvinyl chloride (PVC) line installed on top of the unit. Water is directed to the City of Franklin sanitary sewer through a buried 4-inch PVC pipe. A sampling port is installed in the air stripper effluent line.

4.3 PERMITS

An air permit for the air stripper unit was not required by the IDEM because expected VOC emissions developed by Wehran EMCON do not exceed or approach the 15 pounds per day allowed by IDEM, even in a worst-case scenario (see Appendix D).

A Water Pollution Control Facility Construction Permit (No. 2343) was granted by IDEM for the installation of the ICM.

Permission was granted by the City of Franklin to discharge treated effluent to the municipal sanitary sewer system. Monthly monitoring of treated effluent for total VOCs is being required. However, it is anticipated that the monitoring frequency will be reduced to quarterly once the performance of the air stripper has been established.

4.4 FAIL SAFE FEATURES

The system is equipped with several features that will discourage system tampering and prevent the release of untreated water to the environment.

1. High and low air stripper blower pressure switches will stop the operation of the groundwater extraction pumps and the air stripper if blower pressures are too high or too low.
2. An air stripper sump high level control stops the operation of the groundwater extraction pumps if the water level in the air stripper sump becomes too high.
3. An alarm light on the north side of the air stripper building will be activated in the event of a shutdown for the above-mentioned reasons. Wehran EMCON personnel will be contacted by a designated person at the plant in the event of a shutdown.
4. The system will not automatically restart. The system must be reactivated manually in the event that there is a shutdown for the above reasons, or because of a power failure.
5. PVC casings are pressure tested to prevent the below ground release of untreated water in the event of a failure of the tubing between the groundwater extraction pump and the air stripper building.
6. The air stripper building is electrically heated and has no windows. The single door is secured with a padlock.
7. The air stripper building is constructed on a concrete slab floor, and is heavily insulated and soundproofed.

4.5 OTHER FEATURES

The installed system has several features that can facilitate system expansion or component changeover.

1. A 4-inch PVC backup casing is stubbed into the floor next to each PVC casing in current use to allow additional lines to be run to each wellhead.
2. An electric conduit is stubbed into the floor next to each 4-inch PVC casing in current use to accommodate the use of electric pumps should it become necessary.
3. An additional 4-inch casing, a backup casing and an electric conduit are installed at the northwest corner of the air stripper building to accommodate an additional pumping well should it become necessary.
4. The three-tray air stripper unit can accommodate two additional trays should additional removal capacity be required.
5. The stripper building was built with ample room to install additional pieces of equipment.

4.6 INITIAL STARTUP/OPERATION

Full system startup began the week of February 13, 1995. Prior to operation, a complete round of groundwater levels were collected. Initial pumping rates for each recovery well and anticipated initial drawdowns were as follows:

RW-1: 8 gpm; <0.5 feet below the storm sewer invert.

RW-2: 5 gpm; 0.5 feet below the storm sewer invert.

RW-3: 5 gpm; 0.5 feet below the storm sewer invert.

Table 4.1 shows ICM pumping and drawdown information for the first two weeks of pumping (February 16, 1995 through March 2, 1995). Information was provided by Wehran EMCON. During that fourteen-day period, recovery well RW-2 pumped approximately 65,047 gallons (3.3 gpm), RW-3 pumped approximately 110,993 gallons (5.5 gpm), and RW-1 pumped only 5,760 gallons because of mechanical problems.

Drawdown at MW-12, the Unit B monitoring well closest to RW-2, was -0.21 feet. The March 2, 1995 groundwater elevation was 719.11 feet, slightly above the measured storm sewer invert elevation of 718.88 feet at the south storm sewer manhole.

Drawdown at MW-22, the Unit B monitoring well closest to RW-3, was -0.06 feet. The March 2, 1995 groundwater elevation was 719.52 feet, slightly below the measured storm sewer invert elevation of 719.72 feet at the north storm sewer manhole.

Drawdown at IT-2 was -0.15 feet. The March 2, 1995 groundwater elevation was 719.10 feet, slightly above the estimated storm sewer invert elevation of 718.88 feet at the point closest to IT-2.

There was a slight increase of +0.02 feet in groundwater elevation at MW-30, the monitoring well closest to RW-1, which operated very little during this period. Wells located away from the recovery wells, generally showed increases in groundwater elevation. This is particularly the case at MW-27 (+0.16 feet), MW-28 (+0.06 feet), and MW-29 (+0.11 feet). These increases are probably the result of thawing subsoil, and accumulated snow on the ground surface.

4.7 EFFLUENT MONITORING

Monthly effluent monitoring for total VOCs was initially required by the City of Franklin, but was subsequently reduced to quarterly sampling. Future monitoring requirements will be dependent upon the results of these initial tests, but monitoring frequency will likely be reduced to quarterly.

Table 4.2 summarizes available analytical data for the ICM from March 9, 1995 through August 3, 1995. The approximate air stripper feed concentrations ranged from 2,500 to 3,800 µg/L TVOC. During this period, only one effluent sample (March 29, 1995, 3.3 µg/L TVOC) had TVOC above detection limits. Cumulative pumpage and average pumping rates for each extraction well for the period of February 24, 1995 to June 19, 1995 are summarized in Table 4.3.

4.8 CONCLUSIONS AND RECOMMENDATIONS

Preliminary performance data indicate that there should be sufficient drawdown in the vicinity of the three recovery wells to lower the groundwater surface elevation below that of the storm sewer invert. The results at IT-2 suggest that pumping at RW-2 is lowering the groundwater surface off site as well, and should be capable of reversing off-site groundwater flow in this area. Additional performance data should be collected and evaluated to determine the effectiveness of the present ICM configuration and pumping rates on water levels in monitoring wells MW-27, MW-28 and MW-29. Results from IT-2 can be used to evaluate drawdown between RW-1 and RW-2, but there is no similar monitoring point between RW-2 and RW-3. It may be necessary in the future to install a piezometer between RW-2 and RW-3 to evaluate ICM performance in this zone.

5.0 IDENTIFICATION AND DEVELOPMENT OF THE CORRECTIVE MEASURE ALTERNATIVES

5.1 CORRECTIVE MEASURE OBJECTIVES

The overall objective of the corrective action is to protect public health and the environment from unacceptable risk associated with impacts identified in the RFI and previous site investigations. The RFI and previous studies have delineated impacts to soil, surface water and groundwater from past manufacturing practices at the former Amphenol site. Principal impacts include: on-site subsurface soils located south of the facility buildings and impacted with PCE above the ARAR; on-site groundwater impacted with VOCs (PCE, TCA, TCE) above ARARs; water impacted with PCE and TCE above ARARs which is transmitted from the site to Hurricane Creek through the storm sewer during periods of elevated groundwater levels; and off-site groundwater impacted with VOCs (PCE, TCA, TCE) above ARARs. Table 5.1 provides a list of ARARs for groundwater and soils. This list of ARARs has been updated from Table 11 in the approved RFI report to reflect toxicity data changes that impact both risk-based PRGs and RCRA action levels.

A qualitative risk assessment conducted as part of the RFI determined that exposure to impacted soil and groundwater both on-site and off-site is limited because of the depth of the impacts, and does not present an unacceptable risk. Exposure to impacted groundwater at the storm sewer outlet to Hurricane Creek was also determined to not present unacceptable risk. An ecological risk assessment conducted as part of the RFI determined that the effect on fishes, crayfish and aquatic macroinvertebrates from exposure to VOCs introduced into Hurricane Creek from the former Amphenol facility are now and have been minimal.

The objectives of the corrective measure have been developed in light of the limited exposure to the impacted media and the minimal risk to the public health and environment posed by the impacts. Specifically, the objectives of the corrective measure are the following:

1. Reduce the concentration of PCE in on-site soils of the Unit B aquifer in the vicinity of the old sanitary sewer line to minimize the future release of PCE into groundwater.

2. Prevent the future off-site migration of groundwater impacted with PCE above the MCL of 5 μg/l.

3. Prevent the future off-site migration of groundwater impacted with TCA above the risk based PRG concentration of 1,550 μg/l.

4. Prevent the future off-site migration of groundwater impacted with TCE above the MCL of 5 μg/l.

5. Prevent the future transport of impacted groundwater to Hurricane Creek through the storm sewer along the southern property border of the former Amphenol site.

Findings contained in the RFI indicate that there are impacted soils and groundwater off-site which are different in character from the impacted media found on the former Amphenol property. These impacted soils and groundwater are also physically removed from the impacted media associated with discharges from the operating facility on the former Amphenol property (Sheet 1: PGP-6, -7, and -13). The RFI has concluded that the source of these impacts is not the former Amphenol site or discharges from operations at the former Amphenol site.

5.2 SCREENING OF CORRECTIVE MEASURE TECHNOLOGIES

The purpose of this section of the CMS is to identify applicable and appropriate remedial technologies for the site based on the impacts present and the site characteristics. The potentially applicable remedial technologies are screened to eliminate those that prove unfeasible to implement, that are unable to perform satisfactorily, or that do not meet the corrective action objectives, identified in Section 5.1, within a reasonable time period. The screening step also eliminates technologies based on inherent technology limitations or lack of performance data.

The site has been divided into operable areas which contain similar media and similar levels of impact. General response actions for the media within each area are expected to be similar and have been identified individually. The volumes of impacted soils and groundwater in each area have been estimated. The results of the screening process are summarized in a matrix format (Table 5.2).

5.2.1 DEFINITION OF OPERABLE AREAS

Figure 5-1 illustrates the locations of the operable areas which have been identified as Areas 1, 2, and 3.

Area 1 includes the subsurface media located within the property boundaries of the former Amphenol facility, and closely associated off-site wells IT-2 and IT-3 (Sheet 1, Appendix A). Area 1 corresponds with a portion of the on-site lithostratigraphic unit identified as Unit B in the approved RFI report. Unit B has been identified from approximately 3 to 28 feet below grade, comprised of a silty sand deposit which is saturated at the lower levels. Unit B is underlain by a dense till layer 17 to 20 feet in thickness, designated Unit C. Impacts have not been noted in Unit C or deeper, except for those incidents believed to be caused by carry-down during well drilling activities.

Area 2 consists of the storm sewer located south and southeast of the former Amphenol facility. VOC impacted groundwater enters the storm sewer through faults in the pipe during periods of high groundwater levels and is discharged at the outfall to Hurricane Creek.

Area 3 consists of a linear zone of the Unit B media located southwest of the property boundary along Forsythe Street. A plume of impacted groundwater has been identified along the route of the sanitary sewer line beneath Forsythe Street. Based on the location and orientation of the plume of impacted groundwater, it appears that wastewater discharged from the former Amphenol facility once leaked through joints in the sewer line.

5.2.2 AREA 1

The subsurface soil in Area 1 at a depth corresponding to the water table contains levels of PCE in excess of the ARAR. The groundwater in this zone has been impacted by volatile organic compounds, derived in part from subsurface soils, and contains levels of PCE, TCE, and TCA exceeding the ARARs.

5.2.2.1 Soils

General response actions which might be considered appropriate for the impacted soils in Area 1 are: no action; institutional controls (deed restrictions), soil monitoring; soil vapor extraction (SVE); excavation of the soils in the area of the abandoned sewer; on-site treatment of excavated soils; and off-site disposal of excavated soils. One or more of these remedial response actions will be required to achieve the corrective action objectives presented in Section 5.1.

5.2.2.2 Groundwater

General response actions which might be considered appropriate for the impacted groundwater in Area 1 are: no action; institutional controls (deed and well installation restrictions), groundwater monitoring; containment; air sparging; collection with on-site treatment followed by reinjection; and collection with on-site treatment followed by off-site disposal. One or more of these remedial response actions will be required to achieve the corrective action objectives presented in Section 5.1.

An interim corrective measure (ICM) consisting of an on-site groundwater collection system and air stripper has been installed at the former Amphenol facility. Groundwater treated by the air stripper is discharged to the sanitary sewer.

5.2.2.3 Air

Consistent with the provisions of the approved RFI Work Plan, air impacts were not investigated. However, it is reasonable to assume that volatilized constituents may accumulate in below grade, confined, non-ventilated areas such as utility manholes or the storm sewer pipe, or may be released as a result of remediation activities. General response actions considered appropriate to address potential air impacts include: no action; institutional controls; and vapor recovery with on-site treatment. Implementation of one or more of these general response actions may be necessary to achieve the corrective action objectives presented in Section 5.1.

5.2.3 AREA 2

The groundwater in Area 2 associated with the storm sewer has been impacted by volatile organic compounds and contains levels of PCE, TCE, and TCA exceeding ARARs.

5.2.3.1 Soils

Soils impacted above ARARs are not present in Area 2, and no corrective measures are considered for soil in Area 2.

5.2.3.2 Groundwater/Storm Sewer Water

General response actions considered appropriate for impacted storm sewer water in Area 2 are: no action; institutional controls; containment of VOCs in the on-site groundwater; and collection with on-site treatment or off-site disposal. Collection of on-site groundwater should have the effect of lowering the groundwater level, eliminating the potential for groundwater to enter the storm sewer. One or more of these remedial response actions will be required to achieve the corrective action objectives presented in Section 5.1.

The ICM groundwater collection system and air stripper installed at the former Amphenol facility is designed to lower the elevation of the on-site groundwater table, restricting the potential for groundwater to enter the storm sewer.

5.2.3.3 Air

Consistent with the provisions of the RFI Work Plan, air impacts were not investigated. However, it is reasonable to assume that volatilized constituents may accumulate in below grade, confined, non-ventilated areas such as utility manholes or the storm sewer pipe, or may be released as a result of remediation activities. General response actions considered appropriate to address potential air impacts include: no action; institutional controls; and vapor recovery with on-site treatment. Implementation of one or more of these general response actions may be necessary to achieve the corrective action objectives presented in Section 5.1.

5.2.4 AREA 3

The groundwater in Area 3 has been impacted by VOCs and contains levels of PCE, TCE, and TCA exceeding ARARs. Groundwater concentrations of the VOCs in off-site groundwater are significantly lower than those found in the on-site groundwater, indicating that contamination has been transported off-site by leakage from the sanitary sewer and/or migration of impacted groundwater along the sewer bedding. The approved RFI report indicated minimal soil impact by VOCs. Unlike Areas 1 and 2, media characteristics and groundwater flow have not been extensively investigated or monitored in this area.

5.2.4.1 Soils

Soils impacted above ARARs are not present in Area 3, and no corrective actions are considered for soil in Area 3.

5.2.4.2 Groundwater

General response actions considered appropriate for impacted groundwater in Area 3 at this time are: no action; institutional controls; groundwater monitoring; air sparging with soil vapor extraction; groundwater extraction and treatment by air stripping; or activated carbon. Institutional controls would extend to the residential area downgradient of the impacted area and end at Hurricane Creek. One or more of these remedial response actions will be required to achieve the corrective action objectives presented in Section 5.1.

5.2.4.3 Air

Consistent with the provisions of the approved RFI Work Plan, air impacts were not investigated. However, it is reasonable to assume that volatilized constituents may accumulate in below grade, confined, non-ventilated areas such as utility manholes or the storm sewer pipe. General response actions considered appropriate to address potential air impacts include: no action; institutional controls; and vapor recovery with on-site treatment. Implementation of one or more of these general response actions may be necessary to achieve the corrective action objectives presented in Section 5.1.

5.2.5 REMEDIAL TECHNOLOGIES

This section of the CMS contains a master list of remedial technologies and presents an initial screening of these technologies. The purpose of the screening is to eliminate technologies which do not apply due to the nature of the contamination, site conditions, and the effectiveness and implementability of the technology. The technologies are divided into media-specific categories: soil, groundwater, and air. The media-specific categories are then sub-divided based on the type of response action that is involved, such as on-site treatment or off-site disposal. Table 5.2 contains the initial screening of technologies. The following is a description of the screening process and the technologies which were retained. The No Action Alternative has been retained for all media.

5.2.5.1 Soil

Specific soils at the site have been shown to contain levels of PCE above the ARAR. Remedial technologies were screened on their ability to reduce the concentration of PCE in soils and to minimize the future release of PCE into groundwater.

5.2.5.1.1 Institutional Action and Soil Monitoring

Institutional controls at the state or local level that restrict the use of the site or adjacent properties can be implemented as part of the remedial action in the areas where exposure to contaminants may pose a threat to human health. Institutional controls provide methods of limiting the access to and the development of the site by the general public and of monitoring the conditions at the site. Deed restrictions which would limit the excavation of soils in the impacted areas would be an example of an institutional control targeted at preventing exposure to impacted soils. Regular soil monitoring analyses would provide an assessment of conditions at the site.

5.2.5.1.2 Removal

Excavation of soil can be an effective method of removing areas of contamination to other locations for on-site treatment, off-site treatment, or disposal. Conventional earth moving equipment can be used to perform the work. Potential disadvantages include worker exposure to impacted soils, local resident exposure to impacted soils, inhalation of dust and volatilized contaminants generated during excavation, and the need to dewater areas of excavation below the water table.

Excavation is considered reasonable only for the severely impacted soils located in the area of the abandoned sewer line in Area 1. Excavation of all on-site impacted soil would require extensive shoring to protect building foundations and existing monitoring wells because of the depth of the impacted soil. It is likely that a significant quantity of impacted soil would need to be left in place.

5.2.5.1.3 On-Site Treatment

Soils present at the former Amphenol facility may be remediated by on-site treatment which could involve the fabrication and/or mobilization of a treatment system, the excavation of soil, and subsequent treatment.

Direct Treatment

Direct treatment options such as aeration and low temperature thermal desorption are applicable with excavation of the contaminated soils. Soils are typically removed and transferred to the treatment location.

Aeration involves the introduction of air through the excavated contaminated soils by windrowing and tilling the soils. Potential disadvantages include the release of volatilized contaminants from the treatment, which may result in the exposure of workers and local residents to VOCs, and the fact that the contamination is not treated or destroyed, but only transferred to another medium.

Low-temperature thermal desorption removes the volatile contaminants from soil by use of elevated temperatures, aeration, and agitation, generally in a rotary dryer. Contamination is not destroyed in this step, but transferred to the vapor phase. Vapors containing the volatile contaminants are then released to the atmosphere, or treated using carbon adsorption or thermal oxidation. This may require IDEM permitting, or the treatment of the released VOCs. If activated carbon is utilized to treat the vapor, on-site regeneration or replacement will be required at regular intervals.

In Situ Treatment

In situ treatment options such as aeration, soil flushing, and soil vapor extraction (SVE) do not require the excavation of the contaminated soils.

Aeration, like its direct treatment counterpart, involves the removal of the volatile contaminants by air. A series of injection wells and an air blower are used to force the air through the soil. The contaminant-laden air is generally vented to the atmosphere. Soil flushing involves the removal of the contaminants from the soil by an injected liquid which is collected in wells and then treated on-site or disposed of off-site.

SVE involves the removal of soil gas by applying vacuum to extraction wells. Fresh air replacing the extracted soil gas removes more VOCs from the soil, and is subsequently extracted. The extracted vapor is vented to atmosphere, or treated on-site using carbon adsorption or thermal oxidation. If activated carbon is utilized, on-site regeneration or replacement will be required at regular intervals.

5.2.5.1.4 Off-Site Disposal

Off-site disposal of impacted excavated soils may be a viable remedial option. However, impacted soil having a total constituent analysis with PCE greater than 5.6 mg/kg or TCE greater than 5.4 mg/kg would require incineration prior to disposal. Because of the detected levels of PCE in the soil likely to be considered for disposal, it is expected that incineration would be required.

5.2.5.2 Groundwater

Groundwater at the site has been shown to contain levels of chlorinated VOCs, including PCE, TCA, and TCE, above ARARs. Remedial technologies were screened on their ability to reduce the concentrations of PCE and TCE in groundwater below the drinking water MCL of 5 µg/l, and of TCA below the risk-based PRG concentration of 1,550 µg/l.

5.2.5.2.1 Institutional Action and Groundwater Monitoring

Institutional controls at the state or local level that restrict the use of groundwater at the site and surrounding properties can be implemented as part of the remedial action in the areas where exposure to contaminants may pose a threat to human health. Deed restrictions which would restrict well installation and groundwater usage in the impacted areas is an example of an institutional control targeted at preventing exposure to impacted groundwater. Regular groundwater monitoring and analyses would provide an assessment of conditions at the site.

5.2.5.2.2 Collection

Collection of groundwater is an effective method of removing contamination. Standard well installation techniques are generally used to collect the impacted groundwater. Potential disadvantages include worker exposure to groundwater during well installation and groundwater recovery. Also, the contamination is not treated or destroyed, but only transferred to another medium.

Collection potentially applies to the impacted groundwater in Areas 1, 2, and 3, and would be an important part of any on-site treatment, effluent disposal, or off-site treatment alternative.

5.2.5.2.3 On-Site Treatment

Impacted groundwater present at the former Amphenol facility may be remediated by on-site treatment. On-site treatment may involve in situ groundwater sparging with air, the fabrication and/or mobilization of a treatment system, installation of a collection system as described in Section 5.2.5.2.2, and subsequent treatment and discharge.

Groundwater sparging with air is a technology applied in situ to enhance the volatilization of VOCs. Air is injected through conventional wells having screened intervals below the water table. VOCs are transferred from the groundwater into the sparge air. The VOC air or vapor is typically removed using SVE wells installed above the water table and operated under a vacuum.

Air stripping, as presently employed in the ICM, is an effective technology commonly applied for treatment of VOCs. It consists of passing the collected groundwater through a counter-current device and allowing the water to contact air over a high surface area packing. The volatile contaminants are partitioned out of the water and into the air stream. The treated water is disposed of in some manner, while the extracted air is released to the atmosphere, or treated using carbon adsorption or thermal oxidation. If activated carbon is utilized, on-site regeneration or replacement will be required at regular intervals. Air stripping units may require routine maintenance and may need to be periodically cleaned of accumulated scale.

Activated carbon adsorption can also be used to treat the contaminated water effectively and is commonly used for VOC-impacted water. The collected water is passed through a pair of series-connected carbon adsorption cells. As the water passes through the carbon, the VOCs are adsorbed to the active sites on the carbon surface. The treated water is disposed of in some manner. Following some period of time, the activated carbon will become saturated with VOCs and will need to be replaced to provide continued treatment. Activated carbon may be used in conjunction with air stripping to polish the effluent prior to either surface or subsurface discharge. However, depending on specific permit requirements, the use of activated carbon may not be required.

5.2.5.2.4 Effluent Disposal

The use of an on-site groundwater treatment system as described in Section 5.2.5.2.3 requires effluent disposal. Effluent from a groundwater treatment system can be disposed of off-site to either the sanitary or storm sewer, or on-site through a reinjection system.

Groundwater treated to a sufficient level to meet the municipal water treatment authority's standards may allow the water to be discharged to a publicly-owned treatment works (POTW). Discharge to the POTW requires the approval of the municipal authority, payment of a fee based on the volume of water discharged, and periodic testing of water quality.

Groundwater treated to a sufficient level to meet national standards may allow the water to be discharged to a surface water body via the storm sewer. Discharge to surface water requires a NPDES permit from the IDEM, which reviews the quantity, source, and treatment efficiency involved and declares a minimum sampling and analysis schedule for the discharge.

Groundwater treated to a sufficient level to meet state regulatory standards may allow the water to be reinjected or reinfiltrated on-site to promote flushing or *in situ* treatment of contaminants in the soil. Reinjection requires a groundwater injection permit, notification, or permit waiver, based on a review of the quantity, source, and treatment efficiency involved.

5.2.5.2.5 Off-Site Treatment

Off-site treatment requires the installation of an on-site groundwater collection system as described in Section 5.2.5.2.2. Untreated groundwater may be discharged to the POTW if contaminant concentrations are acceptable to the municipal authority and if the requirements discussed in Section 5.2.5.2.3 are met.

5.2.5.3 Air

5.2.5.3.1 Institutional Action

Institutional controls at the state or local level that restrict the use of the site can be implemented as part of the remedial action in the areas where exposure to contaminants may pose a threat to human health.

Access to the site may need to be restricted during excavation activities or treatment activities which may release contaminant vapors. Personnel entry of sanitary or storm sewer manholes in the vicinity of the site should entail compliance with standard confined space entry practices including air monitoring, ventilation, and worker communication and rescue procedures. Regular monitoring of ambient contaminant concentrations in air may be implemented during excavation activities and soil or groundwater treatment activities which may result in the release of contaminant vapors.

5.2.5.3.2 On-Site Treatment

Contaminant vapors released from on-site treatment systems described in Sections 5.2.5.1.3 and 5.2.5.2.3 may require treatment to remove the contaminants to acceptable levels prior to off-gas release.

Activated carbon adsorption treatment of off-gases is an accepted method for treating organic contaminants in the vapor phase. As the vapors pass through the carbon, the organic contaminants are adsorbed at the active sites on the carbon surface. The treated air stream is then discharged to atmosphere. If activated carbon is utilized, on-site regeneration or replacement of the carbon media will be required at regular intervals.

Thermal oxidation of the treatment off-gases is an another accepted method for treating organic contaminants in the vapor phase. The contaminants are destroyed by high temperatures as they pass through the thermal oxidizer's combustion chamber. The treated air stream is then discharged to atmosphere. Thermal oxidizers may be required to be permitted and regularly tested during use.

5.3 IDENTIFICATION OF THE CORRECTIVE MEASURE ALTERNATIVES

The technologies which remain following the screening have been assembled into alternatives. The site has been divided into different areas because of the potential for location-specific remediation strategies within the site. These are shown in Figure 5-1. These area designations have been made based on the nature of the impacted materials in these areas and will be used throughout the following discussions. Table 5.3 summarizes the remedial actions proposed for each area in the remedial alternatives.

5.3.1 ALTERNATIVE 1: NO ACTION

Alternative 1 is the No Action Alternative and serves as the basis to which all other alternatives can be compared. Under this remedial alternative, no active remedial action or institutional action would be taken regarding the site.

5.3.2 ALTERNATIVE 2: INSTITUTIONAL CONTROLS; MONITORING

ALTERNATIVE 2A: INSTITUTIONAL CONTROLS; MONITORING; GROUNDWATER EXTRACTION AND TREATMENT WITH AIR STRIPPING

The following remedial actions would be performed under Alternative 2 for the three identified operable areas:

- Area 1: Restrict access to and use of the soils and groundwater by means of deed restrictions on the site. Restrict the use of the impacted groundwater by off-site users. Initiate a periodic groundwater monitoring program to monitor for potential contaminant migration. Recommend standard confined space entry procedures for entering storm sewer and sanitary sewer manholes in the area.

- Area 2: Restrict the use of the impacted surface water and groundwater by off-site users. Initiate a periodic monitoring program to monitor for contaminants in the storm sewer water. Recommend standard confined space entry procedures for entering storm sewer manholes.

- Area 3: Restrict the use of the impacted groundwater by off-site users, including the entire residential area downgradient of the identified area of impact and ending at Hurricane Creek. Initiate a periodic groundwater monitoring program to monitor for potential contaminant migration and determine subsurface characteristics. Recommend standard confined space entry procedures for entering sanitary sewer manholes.

The primary focus of Alternative 2 is to limit direct human exposure to impacted soil and groundwater through deed restrictions and the use of safe access practices in areas of below grade confined spaces such as manholes. This alternative also involves the installation of three monitoring wells in Area 3 to gather additional information on subsurface stratigraphy, groundwater movement, and changes in VOC concentrations with time. Monitoring of Area 3 will be part of all subsequent alternatives. The alternative relies on naturally occurring remedial mechanisms to reduce VOC concentrations is soil and groundwater. Such an alternative is appropriate because the type, location, and characteristics of the impacts do not pose an immediate threat to human health or the environment.

A semi-annual groundwater sampling and analytical program would be implemented in order to determine the fate of VOCs in the groundwater. The program would include all on-site groundwater monitoring wells, off-site monitoring wells IT-2 and IT-3, and three new monitoring wells installed along Forsythe Street extending to the south. Figure 5-2 shows the location of existing monitoring wells and the proposed location of the three new monitoring wells.

In order to monitor the fate of PCE in contaminated on-site soils, soils would be evaluated on an annual basis. Evaluation may be accomplished by collecting and analyzing individual soil samples collected on an annual basis, or by soil gas monitoring.

Alternative 2A includes the institutional and monitoring elements of Alternative 2 but also incorporates the existing interim corrective measure (ICM) of groundwater extraction and air stripping. Alternative 2A is illustrated in Figure 5-3. As indicated previously, one objective of the interim corrective measure is to lower the water table in the vicinity of the storm sewer to below the sewer invert and prevent impacted groundwater from entering the sewer and flowing into Hurricane Creek. The ICM should eliminate a potential exposure pathway not addressed by the institutional controls.

5.3.3 ALTERNATIVE 3: INSTITUTIONAL CONTROLS; MONITORING; GROUNDWATER EXTRACTION AND TREATMENT WITH AIR STRIPPING; GROUNDWATER SPARGING; SOIL VAPOR EXTRACTION

Alternative 3 incorporates the institutional controls, monitoring, and ICM activities discussed previously in Alternative 2A., In addition, groundwater sparging and soil vapor extraction (SVE) would be installed to treat impacted groundwater prior to it leaving the site and to enhance remediation of the most severely impacted soil on site.

The proposed air sparge and SVE system would be configured as follows. One line of approximately 12 air sparging and 3 SVE wells would be installed approximately 50 feet north of the abandoned sewer line source area and oriented in an east-west direction. The sparging system would act to partition the volatile contaminants out of the groundwater and into the air stream, carrying the VOCs into the unsaturated vadose soils above. The screened sections of the air sparging wells would extend six inches into stratigraphic Unit C. The SVE wells would be installed in the vadose soils above the sparge points to collect the VOC-laden soil gas. A second network of approximately 10 air sparging and 2 SVE wells would be installed in the areas of highest impact in the abandoned sewer line source area to enhance the volatilization of VOCs from below the water table and the removal of vapor from the vadose zone. This alternative is illustrated in Figure 5.4.

Corrective measure Alternative 3 would act to remediate the most severely impacted on-site soil and groundwater, including that located southwest of the back parking lot, and provide treatment for any impacted groundwater before it migrates off-site to the adjacent residential property. Alternative 3 also incorporates the ICM which will provide treatment of on-site impacted groundwater and will lower the water table to prevent the transport of groundwater off-site through the storm sewer.

5.3.4 ALTERNATIVE 4: INSTITUTIONAL CONTROLS; MONITORING; GROUNDWATER EXTRACTION AND TREATMENT WITH AIR STRIPPING; SOIL EXCAVATION, AERATION, AND BACKFILL

ALTERNATIVE 4A: INSTITUTIONAL CONTROLS; MONITORING; GROUNDWATER EXTRACTION AND TREATMENT WITH AIR STRIPPING; SOIL EXCAVATION, AND OFF-SITE DISPOSAL

Alternative 4 incorporates the institutional controls, monitoring, and ICM activities discussed previously in Alternative 2A. In addition, severely impacted soils in the vicinity of the sanitary sewer break would be excavated, treated by passive on-site aeration, and backfilled on-site. Alternative 4A is identical to Alternative 4 except that excavated soil would be hauled off-site for incineration and landfilling.

Details of institutional controls, monitoring and the ICM are described elsewhere and are not repeated here. Excavation of impacted soils would be limited to the source area located where the old sanitary sewer line passes above the storm sewer. Non-impacted overburden would be removed and stockpiled, and the contaminated subsurface soils in the abandoned sewer line source area would be excavated utilizing standard mechanical techniques. For Alternative 4, the contaminated soils would be placed on site in windrows and aerated by tilling the soil. Following sufficient aeration to reduce PCE concentrations in the soil to below the ARAR, the treated soils would be backfilled on site. In order to minimize potential exposure to the impacted soil, a site security fence would be installed around the work area. Because the excavation would extend below the water table, partial dewatering of the site and treatment of the groundwater would be required. In Alternative 4A excavated impacted soil would be hauled off-site for treatment and disposal. Because of the PCE content of the soil, it is likely that the soil would have to be treated by incineration before it could be placed in a landfill. Alternatives 4 and 4A are illustrated in Figure 5-5.

Both Alternatives 4 and 4A utilize the ICM to prevent the off-site transfer of impacted groundwater through the storm sewer. In addition, both alternatives remove the highly impacted source soils from the site to reduce the potential for further impacts to groundwater and future migration of impacted groundwater from the site. The excavation of site soils represents an aggressive approach to site remediation, however, excavation and dewatering activities may hinder the operation of the ICM.

5.3.5 ALTERNATIVE 5: INSTITUTIONAL CONTROLS; MONITORING; GROUNDWATER EXTRACTION AND TREATMENT WITH AIR STRIPPING; FOCUSED GROUNDWATER SPARGING AND SOIL VAPOR EXTRACTION

Alternative 5 incorporates the institutional controls, monitoring, and ICM activities discussed previously in Alternative 2A. In addition, severely impacted soils in the vicinity of the sanitary sewer break would be treated by a focused application of air sparging and SVE.

In addition to the on-site monitoring and the ICM described elsewhere, Alternative 5 would include a network of approximately 10 air sparging wells and 2 SVE wells located in the source area near the sanitary sewer break. The screened section of the air sparging wells would extend approximately six inches into the stratigraphic Unit C. SVE wells would be installed in the vadose soils for removal of vapor laden with VOCs. Treatment of the off-gas from the SVE system will likely not be required because of the relatively low quantity of VOC discharge anticipated on a daily basis. Alternative 5 is illustrated in Figure 5-6.

Alternative 5 would act to remediate the highly impacted soil and groundwater on the site, and to reduce the potential of further migration of contaminated groundwater off site.

5.3.6 ALTERNATIVE 6: INSTITUTIONAL CONTROLS; MONITORING; GROUNDWATER TREATMENT WITH AIR STRIPPING AND CARBON ADSORPTION POLISHING; REINJECTION OF TREATED WATER TO PROMOTE SOIL FLUSHING

All institutional controls and monitoring activities would be identical to that of Alternative 2A. In addition, the treated water would be rejected to promote flushing of the impacted soils.

Groundwater would be collected by the extraction wells installed as part of the ICM. Extracted groundwater would be treated to remove VOCs by the existing air stripper, followed by final polishing through a series-connected pair of activated carbon cells. Activated carbon treatment may be required for reinjection of treated water to meet water quality requirements. However, if it can be demonstrated that extraction wells will provide complete capture of reinjected water, then treatment by air stripping may be sufficient. The treated groundwater would be reinjected through a network of wells, infiltration trenches or ponds installed upgradient from the contaminated area on site (Figure 5-7). The reinjection of treated water would promote the flushing of the contaminants from the soil and into the groundwater, where they would be collected by the extraction wells. A groundwater reinjection permit or permit exemption must be obtained before this system could be activated.

This alternative would act to remediate the highly contaminated soil and groundwater on the site, and reduce the potential of further migration of contaminated groundwater off site, since the groundwater collection system would act to lower the groundwater table and to impact the natural groundwater gradient. However, reinjection of treated groundwater may interfere with the lowering of the water table by the ICM.

6.0 EVALUATION OF CORRECTIVE MEASURE ALTERNATIVES

In the following section, each of the corrective measure alternatives developed and described in Section 5.0 is evaluated based on technical, environmental, human health, and institutional criteria. Table 6.1 provides a summary of the evaluation.

On a technical basis each alternative will be evaluated on performance, reliability, implementability, and safety. Performance is based on the projected effectiveness and useful life of the corrective measure. Reliability is based on the operation and maintenance requirements and demonstrated reliability of the technologies or components which make up each alternative. Implementability considers the relative ease of installation and the estimated time required to achieve the corrective measure objectives. Safety considers the potential threats to safety of nearby communities and environments, as well as workers during implementation.

Each corrective measure alternative is evaluated based on environmental and human health criteria. The environmental criteria are short and long term beneficial and adverse effects of each alternative. There are no environmental sensitive areas (such as wetlands or habitat for protected species) that could be impacted by the site, so none of the alternatives affect environmentally sensitive areas.

Each corrective measure is evaluated based on institutional needs. The institutional criteria are requirements of federal, state, and local environmental and public health standards, regulations, guidance, advisories, ordinances, and good community relations. The specific remedial action objectives incorporate the public health standards, regulations, etc. and are the applicable chemical and media specific concentrations identified in Section 5.1.

6.1 ALTERNATIVE 1: NO ACTION

6.1.1 TECHNICAL CRITERIA

Under a No Action Alternative, a technical evaluation of system performance, implementability and reliability is not applicable.

6.1.2 ENVIRONMENTAL CRITERIA

The No Action Alternative will not address the facility conditions and pathways of contamination, and could result in unacceptable human and environmental exposures to the chemicals of concern. Alternative 1 will not meet the environmental criteria.

6.1.3 INSTITUTIONAL CRITERIA

The No Action Alternative will not provide deed restrictions, permits for discharge of air or wastewater, zoning permits, or other institutional means of restricting or preventing exposure to VOCs. The no action alternative may not prevent human off-site exposure to concentrations of site-related chemicals at concentrations above the remedial action objectives and so will not satisfy the institutional criteria.

6.2 ALTERNATIVE 2: INSTITUTIONAL CONTROLS; MONITORING

ALTERNATIVE 2A: INSTITUTIONAL CONTROLS; MONITORING; GROUNDWATER EXTRACTION AND TREATMENT WITH AIR STRIPPING

6.2.1 TECHNICAL CRITERIA

Alternative 2 incorporating institutional controls and groundwater monitoring provides a non-technology based corrective action. As a passive approach, this alternative does not provide for remediation of the source area and may allow the off-site migration of VOCs. Although natural degradation processes may be active in the soil and the Unit B aquifer to reduce contaminant concentrations, the continued migration of contaminants from the site is not desirable. This alternative also does not address the interception of groundwater by the storm sewer routed through the site. Therefore, Alternative 2 does not meet the performance objectives of the CMS. However, the implementation of institutional controls will reduce the risk to the general public, public utility workers, and on-site personnel, and a comprehensive monitoring program will document changes in subsurface impacts and potential risk to public health and safety.

Monitoring provides a reliable means to document the change in the concentration of impacts to groundwater and soil in the Unit B aquifer and to describe subsurface conditions in Area 3. Limited historical data are available to establish trends in VOC concentrations in some locations, and additional data may be beneficial to identify these trends.

Periodic monitoring is readily implementable. The scope of monitoring would include groundwater sampling and VOC analysis at existing on-site and off-site groundwater monitoring wells, the installation and sampling of approximately three new off-site monitoring wells located along Forsythe Street, and the sampling and analysis of on-site impacted soil or soil gas.

Monitoring does not present a risk to public health and safety, to the well installation contractor, or to the technician obtaining samples from the site provided that proper health and safety requirements are followed.

Alternative 2A incorporates the existing ICM system of groundwater extraction and treatment by air stripping in order to prevent the interception and conveyance of impacted on-site groundwater to Hurricane Creek. It is anticipated that the ICM will perform satisfactorily to reduce groundwater elevation in the vicinity of the storm sewer to below the pipe invert and to remove and treat impacted groundwater present on the site. Depending on the actual drawdown obtained at the extraction wells, off-site impacted groundwater may also be captured and treated. Because extraction well RW-3 is located near the source area, enhanced treatment of the groundwater and soils in this area is anticipated. Therefore, the potential for Alternative 2A to achieve performance goals is considered moderate for on-site impacted soil, high for on-site impacted groundwater, moderate for off-site impacted groundwater, and high for surface water.

The technology utilized in the ICM is considered reliable with low operation and maintenance requirements.

Because the ICM is in operation, it is considered highly implementable. The impact of reducing the water table to below the invert of the storm sewer should be realized soon after the implementation of the system.

The implementation of the ICM does not present any unnecessary risk to the health and safety of the general public, on-site personnel, or the treatment system operator provided that proper health and safety requirements are followed.

6.2.2 ENVIRONMENTAL CRITERIA

Alternative 2 will effectively control human and environmental exposures to the chemicals of concern in the short-term, but could result in unacceptable exposures in the long term if the chemicals migrate beyond the area covered by deed or regulatory restrictions. Alternative 2A will prevent human and environmental exposure to chemicals at the site and to chemicals that migrated from the site along the storm sewer. Alternative 2 does not meet the environmental criteria because it does not address chemicals that may continue to migrate from the site in the storm sewer. Alternative 2A does control human exposure and mitigates migration of chemicals in the storm sewer and so meets the environmental criteria.

6.2.3 INSTITUTIONAL CRITERIA

Alternatives 2 and 2A may protect human health and the environment by the use of institutional controls to eliminate potential exposures to the impacted soil and groundwater. For Alternate 2, it is unlikely that institutional controls can be used to limit exposure to impacted groundwater flowing into Hurricane Creek through the storm sewer. A monitoring program will provide information to evaluate the need for additional actions. The institutional controls would be required until the monitoring program demonstrates that all of the remedial objectives had been achieved.

Alternative 2 may require the following institutional controls:

- Deed restrictions or local regulations restricting the use of the site, use of on-site groundwater, and use of off-site groundwater;
- A groundwater monitoring program for the on-site groundwater and storm sewer water;
- A soil monitoring program (if necessary);
- Implementation of standard confined space entry procedures for sewers and manholes that may have been impacted;
- Local permits for installation of monitoring wells along the right-of-way of Forsythe Street; and
- Fencing of the site, which may be subject to local zoning requirements.

Alternative 2A may require the following additional institutional controls:

- Local permits and compliance with building codes and zoning regulations for construction and operation of the air stripper;
- An air discharge permit for the air stripper (this was found not be necessary for the ICM);
- A state permit for the construction of the air stripper (this was obtained for the ICM); and
- A local permit to discharge treated water to the city wastewater treatment plant (this was obtained for the ICM).

Alternative 2 will prevent human exposure to concentrations of site-related chemicals at concentrations above the remedial action objectives and so would probably satisfy the institutional criteria in the short-term. However, in the long-term, Alternative 2 could allow some site-related chemicals in groundwater to flow off-site, which could increase the time needed to achieve the remedial action objectives and possibly the area of impacted groundwater off-site. Therefore, Alternative 2 would require a more extensive monitoring program to evaluate the effectiveness of the institutional controls.

Alternative 2A would prevent site-related chemicals from leaving the site via the storm sewer and will meet the institutional criteria.

6.3 ALTERNATIVE 3: INSTITUTIONAL CONTROLS; MONITORING; GROUNDWATER EXTRACTION AND TREATMENT WITH AIR STRIPPING; GROUNDWATER SPARGING; SOIL VAPOR EXTRACTION

6.3.1 TECHNICAL CRITERIA

An evaluation of the institutional controls and groundwater monitoring relative to technical criteria is presented in Section 6.2.1 and not repeated here.

An evaluation of the groundwater extraction and treatment with air stripping (ICM) relative to technical criteria is presented in Section 6.2.1 and not repeated here.

Groundwater sparging and SVE are proven technologies and are expected to be effective for the treatment of volatile contaminants in both the soil and groundwater. These two technologies are particularly well suited for this application because impacted soil is at or below the water table. Air sparging will not only remove VOCs from the groundwater, but will also enhance volatilization of VOCs associated with the soil. SVE, then, will extract the volatilized compounds from the vadose zone and discharge them to atmosphere. Groundwater sparging and SVE wells would be located along the southern property boundary to provide treatment for impacted groundwater prior to leaving the site. Additional wells would be located in the source area near the sanitary sewer break to reduce contaminant concentrations and reduce the potential for off-site migration of contaminants. Specific design criteria for the groundwater sparging and SVE system may need to be developed through on-site pilot testing. The potential for the combined technologies utilized in Alternative 3 to achieve performance goals are considered high for on-site soils, high for on-site groundwater, moderate for off-site groundwater, and high for surface water.

Groundwater sparging and SVE do not require unusual or complicated operation and maintenance procedures and a properly monitored and maintained system should provide for reliable operation.

A groundwater sparging and SVE system can easily be implemented on the site. Well installation can easily be accomplished using conventional techniques. Standard (packaged) equipment is available for both air sparging and SVE. The installation of all wells would be on the facility property, eliminating the need to obtain easements or approvals for off-site work.

The installation and operation of an air sparging and SVE system does not present any unusual risk to the health and safety of the general public, to on-site personnel, or to the treatment system operator provided that proper health and safety requirements are followed.

6.3.2 ENVIRONMENTAL CRITERIA

Alternative 3 will control human exposure and mitigate migration of chemicals in the storm sewer and so meets the environmental criteria.

6.3.3 INSTITUTIONAL CRITERIA

Alternative 3 will protect human health and the environment by the use of institutional controls to prevent potential human exposure to the impacted soil and groundwater, active remediation of soil and groundwater, and preventing impacted groundwater from entering the storm sewer and flowing off the site. The institutional controls will be required until the monitoring program demonstrates that the remedial objectives have been achieved. A monitoring program will provide information to evaluate the need for additional actions.

Alternative 3 involves the same institutional criteria as Alternative 2 plus the following additional criteria for disposal of treated groundwater:

- A NPDES permit for discharge into the storm sewer, or a local permit to discharge treated water to the city wastewater treatment plant.
- An air discharge permit may be required for the sparging/SVE system.

Alternative 3 will meet the institutional criteria.

6.4 ALTERNATIVE 4: INSTITUTIONAL CONTROLS; MONITORING; GROUNDWATER EXTRACTION AND TREATMENT WITH AIR STRIPPING; SOIL EXCAVATION, AERATION, AND BACKFILL

ALTERNATIVE 4A: INSTITUTIONAL CONTROLS; MONITORING; GROUNDWATER EXTRACTION AND TREATMENT WITH AIR STRIPPING; SOIL EXCAVATION, AND OFF-SITE DISPOSAL

6.4.1 TECHNICAL CRITERIA

An evaluation of the institutional controls and groundwater monitoring relative to technical criteria is presented in Section 6.2.1 and not repeated here.

An evaluation of the groundwater extraction and treatment with air stripping (ICM) relative to technical criteria is presented in Section 6.2.1 and not repeated here.

Excavation of impacted soils from the source area will have limited effectiveness in removing the most severely impacted soils because contaminated soil is at or below the water table near the property boundary, and near buried utilities. The ability of this corrective measure alternative to meet the performance objectives is considered moderate for on-site soil since not all of the impacted soil will be removed from the site, moderate for on-site groundwater because only a portion of the contaminant source is being removed, and moderate for off-site groundwater because the removal of impacted soil will minimize the transfer of additional VOCs to the groundwater having a potential to migrate off-site. Once excavated, impacted soil would be treated using passive aeration. Given sufficient time, passive aeration is expected to achieve the treatment objectives for the excavated soils.

The reliability of soil excavation combined with passive aeration for achieving the performance objectives is considered moderate to high for on-site soil, moderate for on-site groundwater because the removal of the soil will reduce the transfer of additional contaminants to the groundwater, and moderate for off-site groundwater because the removal of impacted soil will minimize the transfer of additional contaminants to the groundwater having a potential to migrate off-site.

The implementability of the soil excavation option is considered low to moderate for the following reasons: (1) much of the impacted soil is below the water table requiring extensive dewatering of the site to accommodate excavation; (2) the excavation would likely extend down a minimum of 20 feet below grade resulting in a large affected area at the ground surface assuming a 1:1 side slope for the excavation; and (3) the excavation would be performed near a property boundary and would likely infringe on the neighboring property owner, requiring Amphenol to obtain special permits to work off-site.

The risk presented by this corrective measure alternative to the health and safety of the general public is considered high because soils undergoing treatment will be exposed for a period of time resulting in increased likelihood of exposure, and the large excavation could pose a risk to neighborhood residents even if appropriate safeguards are in place. The risk of the corrective measure alternative to the health and safety of the workers during implementation is considered moderate because of potential exposure to VOCs during excavation, the possibility of failure of the excavation walls and handling of impacted soils.

6.4.2 ENVIRONMENTAL CRITERIA

Alternatives 4 and 4A control human exposure and mitigate migration of chemicals in the storm sewer and so meet the environmental criteria.

6.4.3 INSTITUTIONAL CRITERIA

Alternatives 4 and 4A will protect human health and the environment by the use of institutional controls to prevent potential human exposure to the impacted soil and groundwater, active remediation of soil and groundwater, and preventing impacted groundwater from entering the storm sewer and flowing off the site. The institutional controls will be required until the monitoring program demonstrates that the remedial objectives have been achieved. A monitoring program would provide information to evaluate the need for additional actions.

Alternatives 4 and 4A involve the same institutional criteria as Alternative 2 plus the following additional criteria related to the excavation and treatment of soil:

- On-site soil treatment may require an air permit and will require control of erosion and runoff from impacted soils being treated on site (Alternative 4).
- Off-site disposal of the soils would require incineration at a permitted facility and disposal of incinerated soils at a permitted facility (Alternative 4A).

6.5 ALTERNATIVE 5: INSTITUTIONAL CONTROLS; MONITORING; GROUNDWATER EXTRACTION AND TREATMENT WITH AIR STRIPPING (ICM); FOCUSED GROUNDWATER SPARGING AND SOIL VAPOR EXTRACTION

6.5.1 TECHNICAL CRITERIA

An evaluation of the institutional controls and groundwater monitoring relative to technical criteria is presented in Section 6.2.1 and not repeated here.

An evaluation of the groundwater extraction and treatment with air stripping (ICM) relative to technical criteria is presented in Section 6.2.1 and not repeated here.

Alternative 5 utilizes the same technologies as Alternative 3 but provides a focused application of air sparging and SVE in the area of soils having the highest impact from VOCs should continued use of the ICM prove ineffective or too slow in reducing those levels of VOCs. The ability of the technologies utilized in this alternative to meet the corrective measure objectives is considered to be high for on-site impacted soils, high for on-site impacted groundwater because the alternative is focused on a source of impacts for groundwater, moderate for off-site groundwater because of reduced potential for additional off-site migration of VOCs, and high for surface water.

The reliability of the alternative to meet corrective measure objectives is considered high because the operation and maintenance requirements of the system components are considered to be low.

The implementability of the corrective measure alternative is considered high because all construction is within the property boundary and conventional techniques can be used for the installation of wells.

The risk presented by this alternative to the general public, on-site personnel, and the treatment system operator is considered low because the construction is non-obtrusive and the system would be designed to collect volatilized contaminants and discharge them to the atmosphere in compliance with applicable air quality criteria, thus minimizing potential impacts at the ground surface.

6.5.2 ENVIRONMENTAL CRITERIA

Alternative 5 controls human exposure and mitigates migration of chemicals in the storm sewer, and so meets the environmental criteria.

6.5.3 INSTITUTIONAL CRITERIA

Alternative 5 will protect human health and the environment by the use of institutional controls to eliminate potential human exposures to the impacted soil and groundwater, active remediation of soil and groundwater, and preventing impacted groundwater from entering the storm sewer and flowing off the site. The institutional controls will be required until the monitoring program demonstrates that the remedial objectives have been achieved. A monitoring program would provide information to evaluate the need for additional actions.

Alternative 5 involves the same institutional criteria as Alternative 2 plus the following requirements for air sparging/SVE:

- A NPDES permit for discharge to the storm sewer, or a local permit to discharge treated water to the city wastewater treatment plant.
- An air discharge permit may be required for the sparging/SVE system.

Alternative 5 meets the institutional criteria.

6.6 ALTERNATIVE 6: INSTITUTIONAL CONTROLS; MONITORING; GROUNDWATER TREATMENT WITH AIR STRIPPING AND CARBON ADSORPTION POLISHING; REINJECTION OF TREATED WATER TO PROMOTE SOIL FLUSHING

6.6.1 TECHNICAL CRITERIA

An evaluation of the institutional controls and groundwater monitoring relative to technical criteria is presented in Section 6.2.1 and not repeated here.

An evaluation of the groundwater extraction and treatment with air stripping (ICM) relative to technical criteria is presented in Section 6.2.1 and not repeated here.

Alternative 6 provides air stripping of groundwater and reinjection of treated water to promote soil flushing. The ability of the technologies utilized in this alternative to meet the corrective measure objectives is considered to be moderate for on-site impacted soils, high for on-site impacted groundwater, moderate for off-site groundwater because of reduced potential for additional off-site migration of VOCs, and high for surface water.

The reliability of the alternative to meet corrective measure objectives is considered high because the peration and maintenance requirements of the system components are considered low.

The implementability of the corrective measure alternative is considered high because all construction is within the property boundary and conventional techniques can be used for the installation of wells.

The risk presented by this alternative to the general public, on-site personnel, and the treatment system operator is considered low because the construction is non-obtrusive and the system is design to collect volatilized contaminants and discharge then to the atmosphere, thus minimizing potential impacts at the ground surface.

6.6.2 ENVIRONMENTAL CRITERIA

Alternative 6 controls human exposure and mitigates migration of chemicals in the storm sewer and so meets the environmental criteria.

6.6.3 INSTITUTIONAL CRITERIA

Alternative 6 will protect human health and the environment by the use of institutional controls to eliminate potential human exposures to the impacted soil and groundwater, active remediation of soil and groundwater, and preventing impacted groundwater from entering the storm sewer and flowing off the site. The institutional controls will be required until the monitoring program demonstrates that the remedial objectives have been achieved. A monitoring program would provide information to evaluate the need for additional actions.

Alternative 6 involves the same institutional criteria as alternative 3 plus a groundwater reinjection permit or permit exemption. Alternative 6 meets the institutional criteria.

7.0 COST ESTIMATES

The capital cost for implementing each remedial alternative has been estimated and the details are provided in Appendix B. Annual operating costs for each alternative have also been estimated and the details are provided in Appendix C.

Unit costs for some items in the estimates were taken from the 1995 Editions of *Means Construction Costs* and the *ECHOS Environmental Restoration Costs* estimation catalogs. Other costs utilized were based on vendor quotes and past experience with similar remediation equipment and construction services. Costs for shipping, engineering, construction management, and contingencies were calculated as a percentage of either the total equipment costs or total installed cost, as noted in the cost estimate assumptions.

All alternatives, excluding Alternative 1 (the No Action Alternative), include operating costs for regular soil and groundwater monitoring and the initiation of institutional controls for the site and surrounding areas. Complete groundwater monitoring was deemed to require the installation of three additional monitoring wells along Forsythe Street. Institutional controls deemed necessary for the site included deed restrictions on the use of the former Amphenol site and on the recovery of shallow groundwater in the impacted areas. In addition, a recommendation to both municipal and private utilities regarding the initiation of standard confined space entry procedures when entering manholes in the impacted areas was considered appropriate.

All alternatives, excluding Alternatives 1 and 2, also include operating costs for the continued operation of the Interim Control Measure (ICM) air stripper installed on site. The groundwater recovery and air stripping system was installed to capture impacted groundwater and to remove the VOCs, prior to the discharge of the water to the sanitary sewer. The discharge of the treated water off-site was intended to effect a lowering of the groundwater table in the area of the storm sewer, preventing the site groundwater from being intercepted and transmitted to the outfall at Hurricane Creek.

Alternatives 3, 4, 4-A, 5, and 6 all include remedial technologies in addition to the ICM air stripping system. While generally increasing the overall cost of both the capital and operating expenses, the addition of these remedial technologies was intended to enhance and expedite the final remediation of the site. A summary of the capital and operating costs for each of the eight alternatives is presented in Table 7.1.

8.0 RECOMMENDATION AND JUSTIFICATION OF THE SELECTED CORRECTIVE MEASURE ALTERNATIVE

8.1 RECOMMENDED CORRECTIVE MEASURE ALTERNATIVE

Based on the available data indicating both the on-site and off-site impacts, the recommended corrective measure is Alternative 5 incorporating institutional controls, monitoring of both on-site and off-site monitoring wells for selected VOCs in groundwater, monitoring of on-site impacted soil for select VOCs (if necessary), the installation of additional monitoring wells along Forsythe Street. Data from these wells will allow more effective observation of the level and fate of VOC impacts in soil and groundwater media, and effects of continued operation of the existing extraction wells and air stripper (ICM), and the implementation of a focused on-site groundwater sparging and SVE.

8.2 JUSTIFICATION OF THE RECOMMENDED CORRECTIVE MEASURE ALTERNATIVE

The implementation of institutional controls presents a logical first step and an easily implementable mechanism to reduce risk to the general public. Local restrictions on the use of groundwater would not present a hardship on the surrounding community since a public water utility provides potable water service to all residences and businesses in the area. Additional signage on site and notification to local utilities recommending the use of standard confined space entry procedures, including monitoring for VOCs and oxygen deficient conditions, simply stresses the use of practices which should already be part of standard operating procedures. Deed restrictions limiting on-site excavation in severely impacted areas does not present unreasonable restrictions on the current site property owner.

Semi-annual monitoring of specific constituents in on-site impacted groundwater and, if necessary, soil is recommended to better characterize the fate of impacts in these areas and to measure the performance of implemented remedial actions. Water level data obtained from monitoring wells located near the storm sewer will provide a measure of the ability of the ICM to lower the water table and provide useful data necessary to help define the extent of influence of the extraction wells.

Semi-annual monitoring of specific parameters in surface water discharged at the storm sewer outfall to Hurricane Creek will be used to determine the performance of the ICM to eliminate the off-site transport of impacted groundwater through the storm sewer.

Semi-annual monitoring of specific constituents in off-site impacted groundwater along Forsythe Street will be facilitated by the installation of three permanent monitoring wells along Forsythe Street and Ross Court. Data obtained from these wells will allow better characterization of the fate of impacts in this area.

An interim corrective measure consisting of three extraction wells and an air stripper has been installed on site and is currently operating. The objectives of the ICM are (1) to lower the water table in the vicinity of the storm sewer to below the invert of the sewer to prevent the transport of impacted groundwater through the storm sewer and into Hurricane Creek, and (2) to provide for the extraction and treatment of impacted groundwater from the site. In addition, pumping from the extraction wells may cause a reversal of groundwater flow in the vicinity of the property boundary and provide capture of some off-site impacted groundwater. The incorporation of the ICM as an element of the recommended corrective measure alternative is justifiable considering both cost and risk based criteria. As indicated in the risk assessment conclusions contained in the RFI, exposure through surface water contact does not pose an unacceptable risk. However, if effective, the ICM will further reduce any health risk associated with exposure through this pathway. Because the ICM is already a functioning system, no additional capital investment is required to include this technology as a part of the recommended corrective measure alternative. The technology does not present any unusual operation and maintenance requirements or excessive operating cost.

Because the majority of impacted soils are below the water table, continued operation of the ICM will result in some reduction in soil VOC concentrations over time. However, the severe impact present in the vicinity of the sanitary sewer break on-site will likely continue to be a source for contaminant migration if not adequately addressed. Should operating data suggest that the ICM is ineffective in reducing VOC levels in on-site soils or that the overall corrective action would benefit from an expedited reduction of soil VOC levels, Alternative 5 also includes the focused application of groundwater sparging and SVE in addition to the ICM. Both air sparging and SVE technologies are well suited for the site due to the volatile nature of the impacts and the sandy characteristics of the Unit B aquifer. While the presence of impacted on-site soils, on-site groundwater and off-site groundwater does not present an unacceptable risk to human health of the environment, the severely impacted soils are proximate to a property boundary. These technologies, although installed on-site, can still provide treatment beyond the property boundary.

Other techniques for soil remediation such as excavation present a number of drawbacks. Excavation would be highly intrusive within the property boundary and the excavation will likely extend beyond the property boundary, affecting the neighboring residential property owner. Excavation presents additional risks to workers because of direct exposure to soils containing high concentrations of VOCs. Because contaminated soil is below the water table, extensive dewatering and treatment of water high in VOCs would be required. Treatment of the excavated soils on site provides increased exposure potential for workers, the employees and residents alike. The off-site transportation of soils for remediation potentially adds risk to both Amphenol and Franklin Power Products. In short, excavation substantially increases risk over the selected corrective measure technology.

Alternative 6 utilizing groundwater extraction and reinjection of treated water to promote soil flushing presents the apparent lowest cost alternative, but is not the recommended alternative. Based on the evaluation criteria summarized in Table 6.1, Alternative 6 was determined to be only moderately effective for the remediation of impacted soils because of the time required to complete the soil flushing process. The selected remedial alternatives would provide a more focused application of the remedial action near the source area with the potential for reducing the overall time frame for remediation.

The operation of the ICM and the focused groundwater sparging/SVE will impact groundwater flow and result in sufficient site remediation to prevent future off-site migration of VOCs above acceptable levels. However, should additional monitoring data indicate that impacted groundwater is migrating off-site onto the neighboring residential property, then the scope of the groundwater sparging and SVE could be expanded to include the installation of additional wells as described in corrective measure Alternative 3.

The recommended corrective measure alternative proposes groundwater monitoring for most off-site impacts and particularly for impacts along Forsythe Street. The location and nature of the impacts, not addressed by other elements of the recommended corrective measure alternative, do not pose an unacceptable risk to the public health and the environment. Therefore, immediate corrective action is not warranted. Because the area of the impacts is residential, active remediation in this area would also prove to be highly disruptive to the neighboring residents.

Data describing impacts to off-site groundwater are limited to samples collected by Geoprobe sampling during Fall 1993 and Spring 1994. The recommended remedial action includes the installation of permanent monitoring wells along both Forsythe Street and Ross Court to observe over time groundwater impacts in this area. These wells would also facilitate the collection of additional data necessary to effectively evaluate remedial alternatives for impacted groundwater in this area if required. Useful data resulting from the installation and sampling from these permanent monitoring wells would include soil classification, permeability, aquifer thickness, water levels, and contaminant concentrations. Routine sampling from these monitoring wells will provide data necessary to assess the fate of impacted groundwater and the potential for continued contaminant migration. Data may indicate that natural attenuation mechanisms, including bioutilization, are reducing contaminant concentrations. However, if the evaluation of the data determine that remedial action is required, then soil vapor extraction with air sparging and groundwater extraction and treatment technologies will be evaluated based on all available data.

TABLE 4.1

INITIAL ICM PERFORMANCE DATA

Former Amphenol Site
Franklin, Indiana

Well ID	Top of Casing Elevation (feet, MSL	Initial Conditions, 2/14/95		2/16/95 to 2/23/95		2/23/95 to 3/2/95		Change in Water Elevation (feet)
		Depth to Water (feet)	Water Elevation (feet, MSL)	Depth to Water (feet)	Water Elevation (feet, MSL)	Depth to Water (feet)	Water Elevation (feet, MSL)	
IT-2	732.25	13.00	719.25	13.25	719.00	13.15	719.10	-0.15
IT-3	728.71	11.10	717.61	11.20	717.51	11.18	717.53	-0.08
MW-3	736.44	16.53	719.91	16.55	719.89	16.49	719.95	+0.04
MW-9	733.04	12.11	720.93	11.82	721.22	11.80	721.24	+0.31
MW-12	736.38	17.06	719.32	17.28	719.10	17.27	719.11	-0.21
MW-20	734.03	n/a	n/a	n/a	n/a	n/a	n/a	n/a
MW-21	737.91	18.06	719.85	18.03	719.88	18.02	719.89	+0.04
MW-22	737.64	17.97	719.67	18.03	719.61	18.12	719.52	-0.15
MW-24	736.02	16.55	719.47	16.85	719.17	16.55	719.47	0.0
MW-26	736.39	15.48	720.91	15.81	720.58	15.19	721.20	+0.29
MW-27	736.63	16.76	719.87	16.54	720.09	16.60	720.03	+0.16
MW-28	738.04	18.27	719.77	18.18	719.86	18.21	719.83	+0.06
MW-29	737.61	18.03	719.58	17.92	719.69	17.92	719.69	+0.11
MW-30	734.84	15.74	719.10	15.70	719.14	15.72	719.12	+0.02

Notes:

(1) RW-1: Pumped approximately 5,760 gallons during the time period 2/16/95 to 3/2/95.

(2) RW-2: Pumped approximately 65,047 gallons (3.3 gpm) during the time period 2/16/95 to 3/2/95.

(3) RW-3: Pumped approximately 110,993 gallons (5.5 gpm) during the time period 2/16/95 to 3/2/95.

(4) n/a - data not available

TABLE 5.1

GROUNDWATER AND SOIL ARARs

Former Amphenol Site
Franklin, Indiana

Chemical	Final Risk-Based PRG Concentrations for Soil (residential) (mg/kg)	Final Risk-Based PRG Concentrations for Ground Water (ug/L)	Maximum Contaminant Level (MCL) (ug/L)	Maximum Contaminant Level Goal (MCLG) (ug/L)	RCRA Subpart S Action Levels (P)	
					Soil (mg/kg)	Ground Water (ug/L)
Acetone	27400	3650	#N/A	#N/A	8000	4000
2-Butanone	164000	2500	#N/A	#N/A	50000	20000
Carbon tetrachloride	4.91	0.259	5	Zero	5	MCL
Chloroform	105	0.275	80(T)	Zero	100	MCL
1,1-Dichloroethane	27400	768	#N/A	#N/A	8000	4000
1,1-Dichloroethylene	1.06	0.0167	7	7	10	MCL
1,2-Dichloroethene	2460	329	70(cis)	70(cis)	700	MCL
Methylene Chloride	85.2	6.31	5	Zero	90	MCL
4-Methyl-2-pentanone	21900	183	#N/A	#N/A	6000	3000
Tetrachloroethene	12.3	1.43	5	Zero	10	MCL
Toluene	1.6	0.213	1000	1000	2	MCL
1,1,1-Trichloroethane	24600	1550	200	200	7000	MCL
Trichloroethene	58.1	2.54	5	Zero	60	MCL
Xylene, total	548000	73000	10000	10000	200000	MCL
Aluminum	#N/A	#N/A	50(S)	#N/A	#N/A	#N/A
Antimony	110	14.6	6	6	30	MCL
Arsenic	0.355	0.0473	50(U)	#N/A	0.4	MCL
Barium	19200	2560	2000	2000	5000	MCL
Beryllium	0.149	0.0198	4	4	0.2	MCL
Cadmium	137	18.3	5	5	40	MCL
Calcium	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Chromium, VI	1370	183	100(total)	100(total)	400	MCL
Cobalt	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Copper	10200	1350	1300(A)	1300	3000	MCL
Cyanide	5480	730	200(P)	200(P)	2000	700
Iron	#N/A	#N/A	300(S)	#N/A	#N/A	#N/A
Lead	#N/A	#N/A	15(A)	Zero	#N/A	MCL
Magnesium	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Manganese	1370	183	50(S)	#N/A	10000	700
Mercury	82.1	11	2	2	20	MCL
Nickel	5480	730	100	100	2000	MCL
Potassium	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Selenium	1370	183	50	50	400	MCL
Silver	1370	183	100(S)	#N/A	400	200
Sodium	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Thallium	21.9	2.92	2	0.5	6	MCL
Tin	164000	21900	#N/A	#N/A	50000	20000
Vanadium	1920	256	#N/A	#N/A	500	200
Zinc	82100	11000	5000(S)	#N/A	20000	10000

#N/A = Not available

ARAR = Applicable or Relevant and Appropriate Requirements.
PRG = Preliminary Remediation Goal (health-based).
(T) = this value for total trihalomethanes.
MCLs and MCLGs are from "Drinking Water Regulations and Health Advisories", U.S. EPA, May 1994.
Action Levels were calculated according to the recommended assumptions given in the propsed Subpart S rules.

(P)=Proposed
(A)=Action Level
(U) = Under review.

(S)=Secondary standard

TABLE 5.2

INITIAL SCREENING OF REMEDIAL TECHNOLOGIES

Environmental Media	General Response Action	Remedial Technology	Process Option	Retain For Further Analysis	Screening Comments
Soils	No Action	None	Not Applicable	Yes	The No Action Alternative will be carried through to the Detailed Analysis of Alternatives.
	Institutional Action	Access Restriction	Deed Restrictions	Yes	Restrictions on excavation and soil use in impacted areas may be applicable. Must be coordinated with property owner(s) and public agencies.
			Site Fencing	No	Impacted soils are mainly at a depth of >15 feet. Restricting access to site will not affect potential contact with impacted soils.
		Monitoring	Soil Monitoring	Yes	On-going monitoring of site soils may be applicable.
	Surface Water Diversion	Surface Controls	Grading	No	Site already graded for runoff control.
			Soil Cover/ Revegetation	No	Site already has vegetative cover or paving.
			Flood Control Dikes	No	Not necessary due to site elevation and stratigraphy.

TABLE 5.2

INITIAL SCREENING OF REMEDIAL TECHNOLOGIES

Environmental Media	General Response Action	Remedial Technology	Process Option	Retain For Further Analysis	Screening Comments
Soils (cont.)	Containment	Capping (single layer)	Synthetic Membrane	No	May minimize surface water infiltration, but will not affect groundwater flow through impacted soil.
			Natural Soil	No	Site already has natural soil cover.
			Clay	No	May minimize surface water infiltration, but will not affect groundwater flow through impacted soil.
			Asphalt	No	May minimize surface water infiltration, but will not affect groundwater flow through impacted soil.
			Concrete	No	May minimize surface water infiltration, but will not affect groundwater flow through impacted soil.
		Capping (multi-layer)	Multimedia	No	May minimize surface water infiltration, but will not affect groundwater flow through impacted soil.
		Vertical Barriers	Slurry Wall	No	Hydrogeology and vertical extent of groundwater site will limit the effectiveness of a slurry wall.
			Vibrating Beam Bitumen Grout Wall	No	Forms barrier with uncertain integrity due to difficulty in sealing base of wall.

TABLE 5.2

INITIAL SCREENING OF REMEDIAL TECHNOLOGIES

Environmental Media	General Response Action	Remedial Technology	Process Option	Retain For Further Analysis	Screening Comments
Soils (cont.)	Containment (cont.)	Vertical Barriers (cont.)	Grout Curtain	No	Forms barrier of uncertain integrity.
			Metallic Sheet	No	Presence of storm and sanitary sewers in area will not allow driving of sheet pile.
			Concrete Wall	No	Freeze/thaw stresses will cause cracking of concrete, producing a barrier of uncertain integrity.
			Clay Wall	No	May be effective in limiting migration of contaminants from source area.
		Horizontal Barriers	Block Displacement	No	Horizontal barrier is not beneficial for impacted soil below the water table where there is lateral groundwater movement.
			Injection Grouting	No	Horizontal barrier is not beneficial for impacted soil below the water table where there is lateral groundwater movement.
	Removal	Excavation	Mechanical Excavation	Yes	Localized excavation of impacted soils may be effective; either independently or coupled with other technologies. Most impacted soils are at depths >15 feet.
			Consolidation	No	Estimated volumes of soils and type of contamination inappropriate for consolidation.

TABLE 5.2

INITIAL SCREENING OF REMEDIAL TECHNOLOGIES

Environmental Media	General Response Action	Remedial Technology	Process Option	Retain For Further Analysis	Screening Comments
Soils (cont.)	On-site Treatment	Thermal Oxidation	Rotary Kiln	No	Volume of impacted soil is too small for on-site incineration.
			Liquid Injection	No	Not applicable due to contaminant characteristics.
			Fluidized Bed	No	Not applicable due to contaminant characteristics.
			Infrared	No	Volume of impacted soil is too small for on-site incineration.
		Direct Treatment	Aeration	Yes	May be effective in removing contaminants from soil.
			Slurry Degradation	No	Inappropriate due to contaminant characteristics.
			Low Temperature Thermal Desorption	Yes	May be effective in removing contaminants from soil.
			Soil Washing	No	Inappropriate due to volatile nature of contaminants.

TABLE 5.2

INITIAL SCREENING OF REMEDIAL TECHNOLOGIES

Environmental Media	General Response Action	Remedial Technology	Process Option	Retain For Further Analysis	Screening Comments
Soils (cont.)	On-Site Treatment (cont.)	In-Situ Treatment	Microbial Degradation	No	Lack of performance data on chlorinated contaminants.
			Oxidation (chemical detoxification)	No	Inappropriate due to aromatic nature of contaminants.
			Stabilization/ Solidification	No	Inappropriate due to contaminant characteristics.
			Soil Flushing	Yes	May be effective in enhancing removal of contaminants from soil matrix.
			Soil Aeration	Yes	May be effective in removing contaminants from soil matrix.
			Soil Vapor Extraction	Yes	May be effective in removing contaminants from soil matrix.
			Vitrification	No	Cannot be implemented due to site conditions, high water table.

TABLE 5.2

INITIAL SCREENING OF REMEDIAL TECHNOLOGIES

Environmental Media	General Response Action	Remedial Technology	Process Option	Retain For Further Analysis	Screening Comments
Soils (cont.)	Off-Site Treatment	RCRA Incineration	Incineration	Yes	Incineration may be required for off-site disposal.
	On-Site Disposal	RCRA Landfill Construction	Not Applicable	No	Physical location of site makes it inappropriate for constructing a landfill.
		Type II Landfill Construction	Not Applicable	No	Physical location of site makes it inappropriate for constructing a landfill.
	Off-Site Disposal	RCRA Landfill	Not Applicable	No	Incineration required prior to disposal. RCRA landfill is not required.
		Type II Landfill	Not Applicable	Yes	Following incineration, soil can be disposed of in a Type II landfill.

TABLE 5.2

INITIAL SCREENING OF REMEDIAL TECHNOLOGIES

Environmental Media	General Response Action	Remedial Technology	Process Option	Retain For Further Analysis	Screening Comments
Groundwater	No Action	None	Not Applicable	Yes	The No Action Alternative will be carried through to the Detailed Analysis of Alternatives.
	Institutional Action	Access Restriction	Deed Restrictions	Yes	Deed restrictions on well installation and groundwater use may be appropriate.
			Site Fencing	No	Site fencing will not restrict groundwater exposure.
		Monitoring	Groundwater Monitoring	Yes	On-going monitoring of on-site and off-site wells may be applicable.
	Surface Water Diversion	Surface Controls	Grading	No	May be applicable if soil excavation is utilized, but will not affect groundwater flow through impacted soil.
			Soil Cover/ Revegetation	No	Site already has vegetative cover or paving.
			Flood Control Dikes	No	Not necessary due to site elevation and stratigraphy.

TABLE 5.2

INITIAL SCREENING OF REMEDIAL TECHNOLOGIES

Environmental Media	General Response Action	Remedial Technology	Process Option	Retain For Further Analysis	Screening Comments
Groundwater (cont.)	Containment	Capping (single layer)	Synthetic Membrane	No	May minimize surface water infiltration, but will not impact upstream recharge of groundwater and leaching of contaminants.
			Clay	No	May minimize surface water infiltration, but will not impact upstream recharge of groundwater and leaching of contaminants.
			Asphalt	No	May minimize surface water infiltration, but will not impact upstream recharge of groundwater and leaching of contaminants.
			Concrete	No	May minimize surface water infiltration, but will not impact upstream recharge of groundwater and leaching of contaminants.
		Capping (multi-layer)	Multimedia	No	May minimize surface water infiltration, but will not impact upstream recharge of groundwater and leaching of contaminants.
		Vertical Barriers	Slurry Wall	No	Hydrogeology of the site would limit the effectiveness of a slurry wall.
			Vibrating Beam Bitumen Grout Wall	No	Forms barrier of uncertain integrity, due to difficulty in sealing base of wall.
			Grout Curtain	No	Forms barrier of uncertain integrity.

TABLE 5.2

INITIAL SCREENING OF REMEDIAL TECHNOLOGIES

Environmental Media	General Response Action	Remedial Technology	Process Option	Retain For Further Analysis	Screening Comments
Groundwater (cont.)	Containment (cont.)	Vertical Barriers (cont.)	Metallic Sheet Piling	No	Presence of storm and sewers in area will not allow driving of sheet pile.
			Concrete wall	No	Subject to cracking due to freeze/thaw stresses.
		Horizontal Barriers	Block Displacement	No	Horizontal barrier is not effective for lateral groundwater movement.
			Grout Injection	No	Technology not sufficiently developed. Produces a barrier of uncertain integrity.
		Gradient Controls	Barrier Wells	Yes	May be effective in containing groundwater and/ or lowering the groundwater table level.
			Interceptor Trenches/ Drains/Sumps	No	Site geology is more conducive to groundwater diversion via wells.
	Collection	Extraction	Extraction Wells	Yes	May be an effective method of collecting groundwater for treatment and/or lowering the groundwater table level.
		Passive Collection	Interceptor Trenches/ Drains/Sumps	No	Site geology is more conducive to groundwater collection via wells.
	On-Site Treatment	Biological Treatment (Aerobic)	Activated Sludge	No	Aerobic biological treatment of chlorinated VOCs is not well documented or effective unless a co-substrate is available.

TABLE 5.2

INITIAL SCREENING OF REMEDIAL TECHNOLOGIES

Environmental Media	General Response Action	Remedial Technology	Process Option	Retain For Further Analysis	Screening Comments
Groundwater (cont.)	On-Site Treatment (cont.)	Biological Treatment (aerobic) (cont.)	Trickling Filters	No	Aerobic biological treatment of chlorinated VOCs is not well documented or effective unless a co-substrate is available.
			Rotating Biological (Contractor)	No	Aerobic biological treatment of chlorinated VOCs is not well documented or effective unless a co-substrate is available.
			Aerated Lagoons	No	Aerobic biological treatment of chlorinated VOCs is not well documented or effective unless a co-substrate is available.
		Biological Treatment (anaerobic)	Anaerobic Digestion	No	Has been shown to dechlorinate contaminants, but may require additional treatment.
			Anaerobic Fluidized Bed	No	Has been shown to dechlorinate contaminants, but may require additional treatment.
		Biophysical Treatment	PACT Treatment	No	Aerobic biological treatment of chlorinated VOCs is well documented or effective unless a co-substrate is available.
			Aerobic Carbon Fluidized Bed	No	Aerobic biological treatment of chlorinated VOCs is well documented or effective unless a co-substrate is available.
		Chemical Treatment	Neutralization	No	Not applicable due to contaminant characteristics.
			Precipitation	No	Not applicable due to contaminant characteristics.

TABLE 5.2

INITIAL SCREENING OF REMEDIAL TECHNOLOGIES

Environmental Media	General Response Action	Remedial Technology	Process Option	Retain For Further Analysis	Screening Comments
Groundwater (cont.)	On-Site Treatment (cont.)	Chemical Treatment (cont.)	Dechlorination	No	Has been shown to be effective, but would require additional treatment.
			Oxidation	No	Technology is appropriate but prohibitively expensive.
			UV Enhanced Oxidation	No	Technology is appropriate but prohibitively expensive.
			Reduction	No	Not applicable due to contaminant characteristics.
		Physical Treatment	Coagulation/ Sedimentation	No	Not applicable due to contaminant characteristics.
			Carbon Adsorption	Yes	Proven effective in removing VOCs.
			Activated Alumina Adsorption	No	Not applicable due to nature of contamination.
			Ion Exchange	No	Not applicable due to nature of contamination.
			Reverse Osmosis	No	Not applicable due to nature of contamination.
			Air Stripping	Yes	Proven effective in removing VOCs.
			Steam Stripping	No	Effective in removing VOCs, but air stripping would prove more cost effective.
			Filtration	No	Not applicable due to nature of contamination.
			Dissolved Air Flotation	No	Not applicable due to nature of contamination.

TABLE 5.2

INITIAL SCREENING OF REMEDIAL TECHNOLOGIES

Environmental Media	General Response Action	Remedial Technology	Process Option	Retain For Further Analysis	Screening Comments
Groundwater (cont.)	On-Site Treatment (cont.)	Physical Treatment (cont.)	Extraction	No	Generates additional contamination in wastewater stream. Inefficient means of water treatment.
			Solar Evaporation	No	Not applicable due to site conditions and nature of contamination.
			Spray Evaporation	No	The No Action Alternative will be carried through to the Detailed Analysis of Alternatives.
	Effluent Disposal	Publicly owned treatment works (POTW)	Not Applicable	Yes	May be appropriate for disposal of groundwater.
		Direct Discharge	Not Applicable	Yes	May be appropriate if contaminant levels are sufficiently reduced. Requires NPDES permit.
		Reinjection for Soil Flushing	Injection Wells or Reinfiltration Galleries	Yes	May be appropriate if contaminant levels are sufficiently reduced. Requires reinjection permit or permit exemption.
		In-Situ Treatment	Microbial Degradation	No	Lack of performance data on chlorinated contaminants.
			Chemical Treatment	No	Not applicable due to nature of contamination.

TABLE 5.2

INITIAL SCREENING OF REMEDIAL TECHNOLOGIES

Environmental Media	General Response Action	Remedial Technology	Process Option	Retain For Further Analysis	Screening Comments
	Off-Site Treatment	POTW	Not Applicable	Yes	May be an effective means of groundwater treatment.
		RCRA Facility	Not Applicable	No	Concentrations of contaminants in the ground water are not high enough to warrant this type of treatment.
	On-Site Disposal	Deep Well Injection	Not Applicable	No	Requires installation of well through bedrock. May cause contamination of deeper aquifers.
Air	No Action	None	Not Applicable	Yes	The No Action Alternative will be carried through to the Detailed Analysis of Alternatives.
	Institutional Action	Access Restriction	Entry Permit Program	Yes	May be effective in reducing potential exposure to gas in sewer lines.
		Monitoring	Air Monitoring/ Confined Space Tests	Yes	On-going monitoring of site air quality and confined space monitoring of sewer air may be applicable.
	On-Site Treatment	Gas Recovery/ Treatment	Adsorption	Yes	May be appropriate in conjunction with vapors generated by soil/groundwater treatment.
			Thermal Oxidation	Yes	May be appropriate in conjunction with vapors generated by soil/groundwater treatment.
			Flare	No	Marginally effective for chlorinated VOCs.

TABLE 5.3

SUMMARY OF CORRECTIVE MEASURE ALTERNATIVES

Former Amphenol Site
Franklin, Indiana

Alternative Number	Corrective Measure Technologies
1	No Action
2	Institutional Controls; Monitoring
2A	Institutional Controls; Monitoring; Groundwater Extraction and Treatment with Air Stripping (ICM)
3	Institutional Controls; Monitoring; Groundwater Extraction and Treatment with Air Stripping (ICM); Groundwater Sparging; Soil Vapor Extraction
4	Institutional Controls; Monitoring; Groundwater Extraction and Treatment with Air Stripping (ICM); Soil Excavation, Aeration, and Backfill
4A	Institutional Controls; Monitoring; Groundwater Extraction and Treatment with Air Stripping (ICM); Soil Excavation and Off-Site Disposal
5	Institutional Controls; Monitoring; Groundwater Extraction and Treatment with Air Stripping (ICM); Focused Groundwater Sparging and Soil Vapor Extraction
6	Institutional Controls; Monitoring; Groundwater Extraction and Treatment with Air Stripping (ICM) and Activated Carbon Polishing; Reinjection of Treated Water to Promote Soil Flushing

TABLE 6.1

EVALUATION OF CORRECTIVE MEASURE ALTERNATIVES BASED ON ABILITY TO ACHIEVE ENVIRONMENTAL, INSTITUTIONAL, AND TECHNICAL CRITERIA

Alternative	CorrectiveMeasure Technologies	Corrective Measure Evaluation Criteria				
		Environmental	Institutional	Technical		
				Soil	Groundwater	Surface Water
1	No Action	low	low	low	low	low
2	Institutional Controls; Monitoring	low	high	low	low	low
2A	Institutional Controls; Monitoring; Groundwater Extraction and Treatment with Air Stripping (ICM)	high	high	moderate	high	high
3	Institutional Controls; Monitoring; Groundwater Extraction and Treatment with Air Stripping (ICM); Groundwater Sparging; Soil Vapor Extraction	high	high	high	high	high
4	Institutional Controls; Monitoring; Groundwater Extraction and Treatment with Air Stripping (ICM); Soil Excavation, Aeration, and Backfill	high	high	moderate	moderate	high
4A	Institutional Controls; Monitoring; Groundwater Extraction and Treatment with Air Stripping (ICM); Soil Excavation and Off-site Disposal	high	high	moderate	moderate	high
5	Institutional Controls; Monitoring; Groundwater Extraction and Treatment with Air Stripping (ICM); Focused Groundwater Sparging and Soil Vapor Extraction	high	high	high	high	high
6	Institutional Controls; Monitoring; Groundwater Extraction and Treatment with Air Stripping (ICM) and Activated Carbon Polishing; Reinjection of Treated Water to Promote Soil Flushing	high	high	moderate	high	high

Note: Evaluation is based on the liklihood of each corrective measure to meet the stated criteria.

TABLE 7.1

CAPITAL AND ANNUAL OPERATING COST SUMMARY FOR CORRECTIVE MEASURE ALTERNATIVES

Former Amphenol Site
Franklin, Indiana

Alternative Number	Corrective Measure Technologies	Capital Cost ($)*	Annual Operating Cost ($)
1	No Action	NA	NA
2	Institutional Controls; Monitoring	24,000	17,000
2A	Institutional Controls; Monitoring; Groundwater Extraction and Treatment with Air Stripping (ICM)	24,000	60,000
3	Institutional Controls; Monitoring; Groundwater Extraction and Treatment with Air Stripping (ICM); Groundwater Sparging; Soil Vapor Extraction	182,000	101,000
4	Institutional Controls; Monitoring; Groundwater Extraction and Treatment with Air Stripping (ICM); Soil Excavation, Aeration, and Backfill	125,000	60,000
4A	Institutional Controls; Monitoring; Groundwater Extraction and Treatment with Air Stripping (ICM); Soil Excavation and Off-Site Disposal	1,347,000	60,000
5	Institutional Controls; Monitoring; Groundwater Extraction and Treatment with Air Stripping (ICM); Focused Groundwater Sparging and Soil Vapor Extraction	119,000	95,000
6	Institutional Controls; Monitoring; Groundwater Extraction and Treatment with Air Stripping (ICM) and Activated Carbon Polishing; Reinjection of Treated Water to Promote Soil Flushing	72,000	68,000

* Capital costs previously incurred for the ICM are not included.

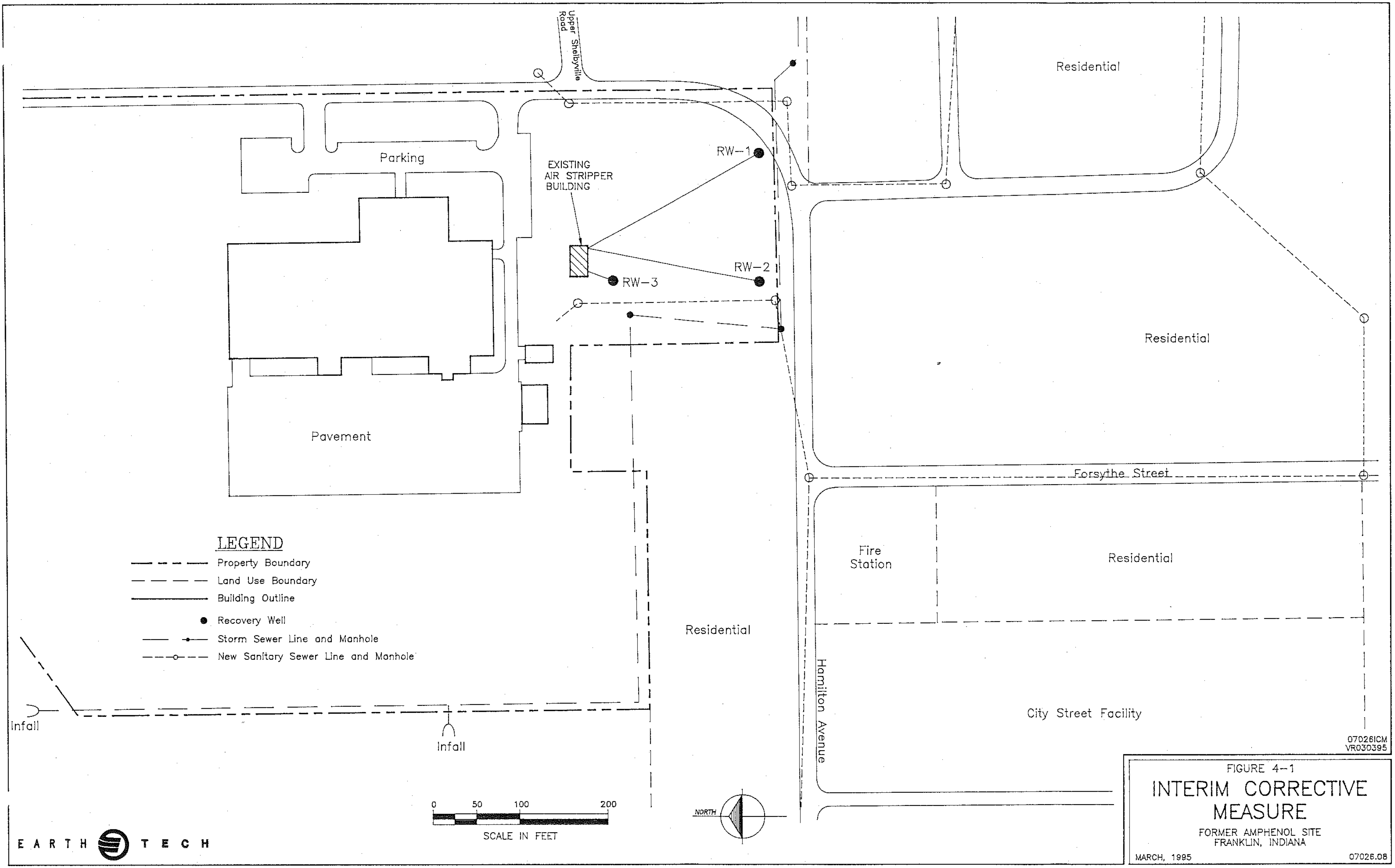


FIGURE 4-1

INTERIM CORRECTIVE MEASURE

FORMER AMPHENOL SITE
FRANKLIN, INDIANA

MARCH, 1995

07026.08

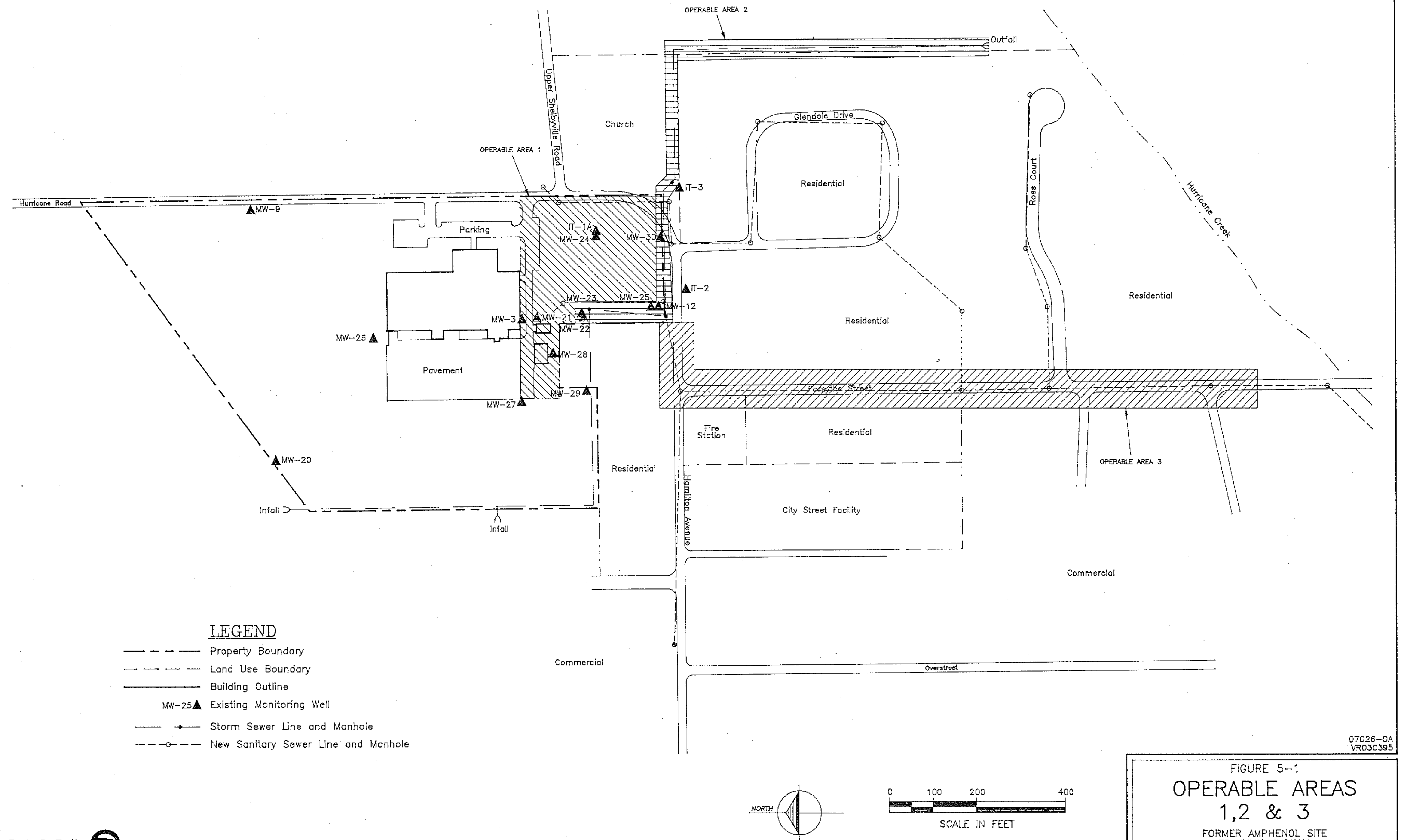


FIGURE 5-1

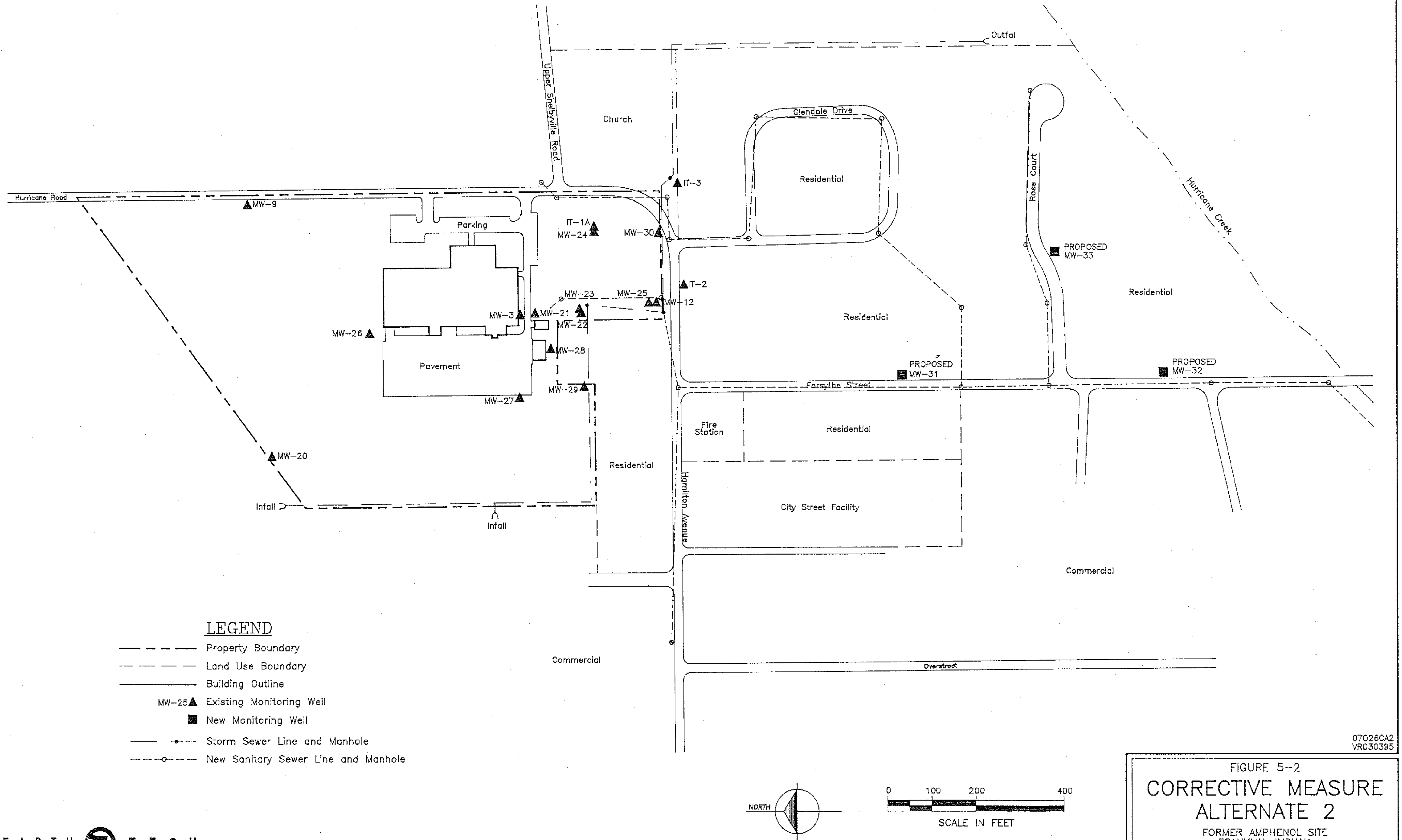
OPERABLE AREAS
1,2 & 3

FORMER AMPHENOL SITE
FRANKLIN, INDIANA

MARCH, 1995

07026.08

EARTH TECH



07026CA2
VR030395

E A R T H T E C H

FIGURE 5-2

CORRECTIVE MEASURE ALTERNATE 2

FORMER AMPHENOL SITE
FRANKLIN, INDIANA

MARCH, 1995

07026.08

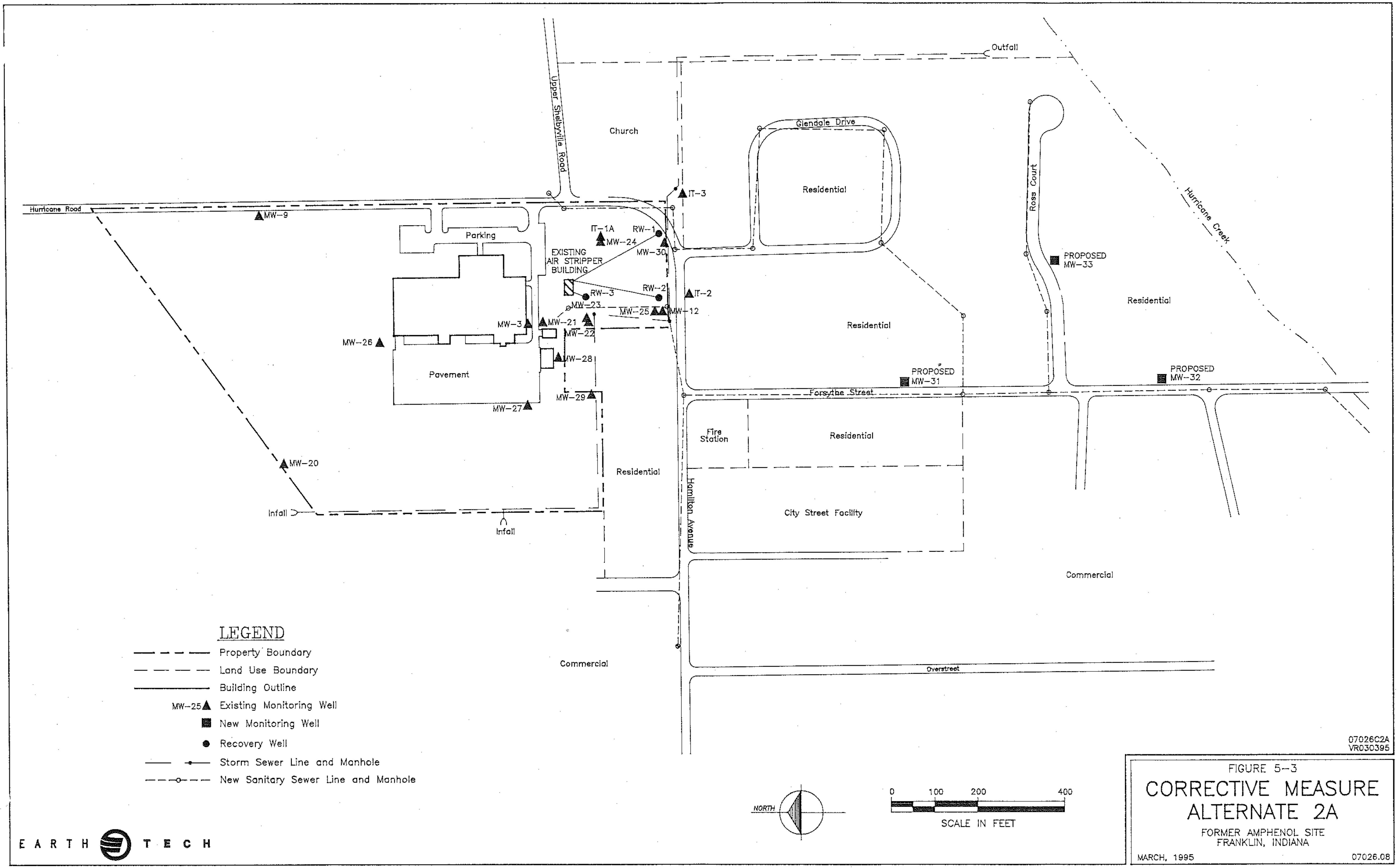


FIGURE 5-3

CORRECTIVE MEASURE ALTERNATE 2A

FORMER AMPHENOL SITE
FRANKLIN, INDIANA

MARCH, 1995

07026.08

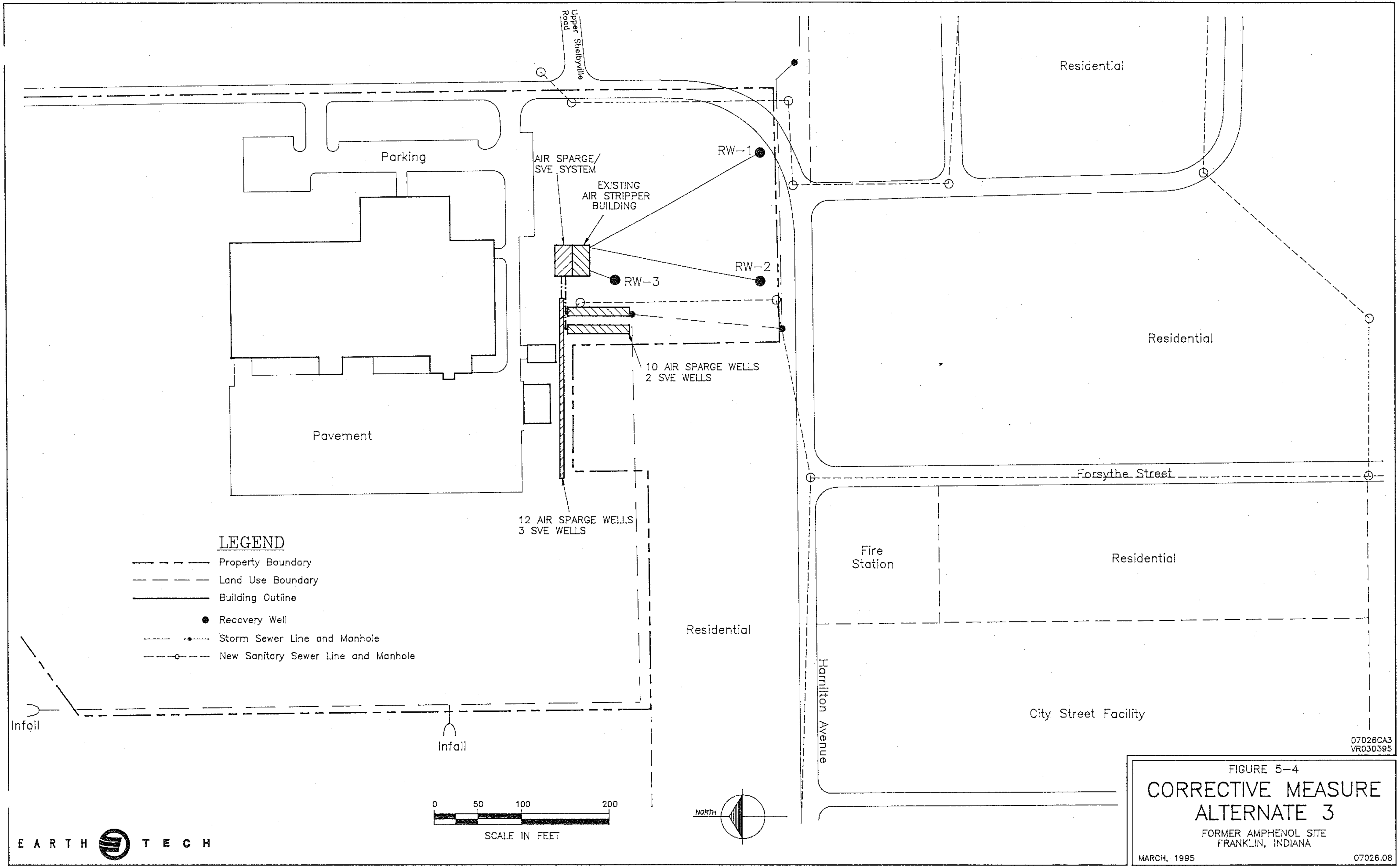


FIGURE 5-4

CORRECTIVE MEASURE ALTERNATE 3

FORMER AMPHENOL SITE
FRANKLIN, INDIANA

MARCH, 1995

07026.08

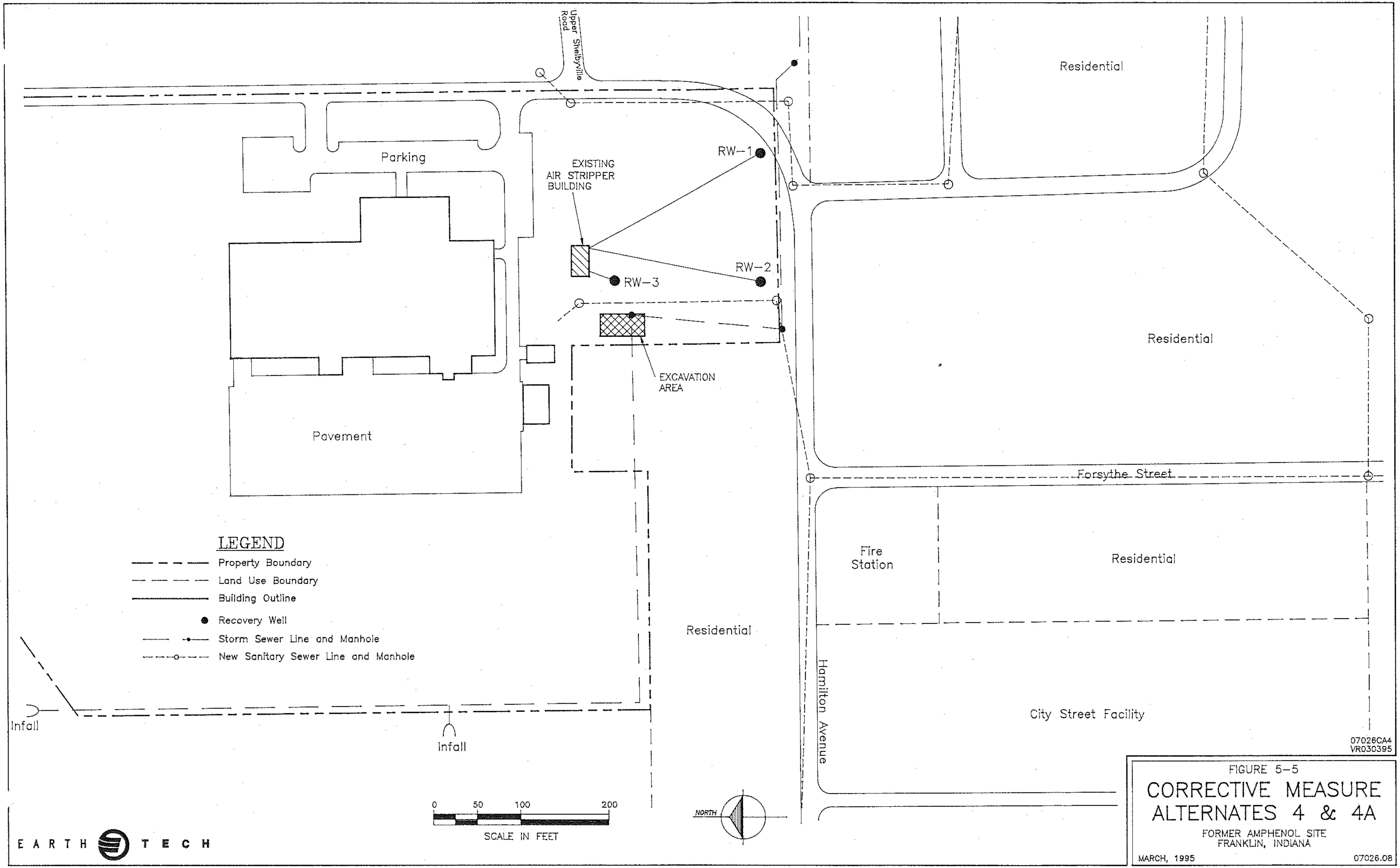


FIGURE 5-5

CORRECTIVE MEASURE ALTERNATES 4 & 4A

FORMER AMPHENOL SITE
FRANKLIN, INDIANA

MARCH, 1995

07026.08

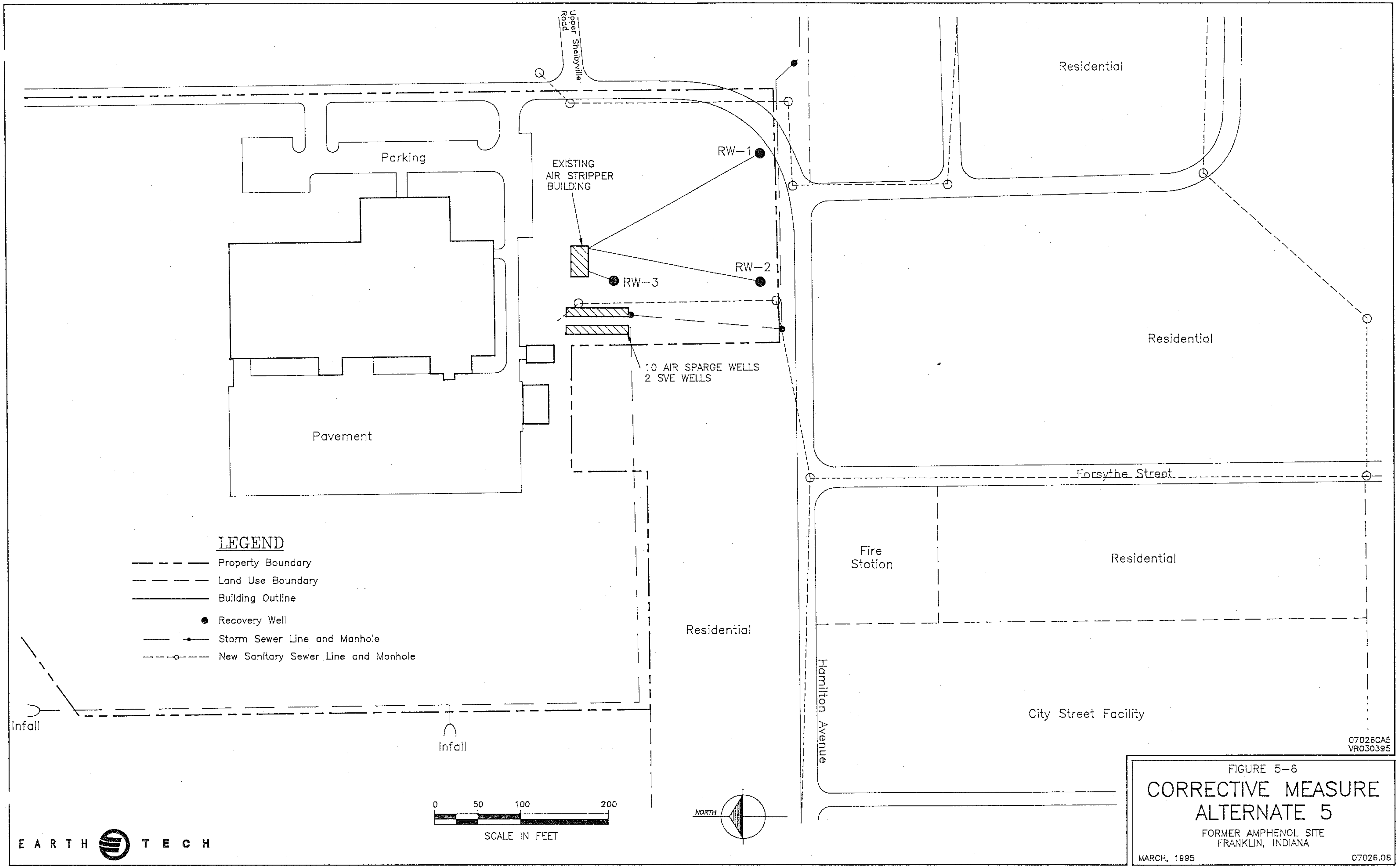


FIGURE 5-6

CORRECTIVE MEASURE ALTERNATE 5

FORMER AMPHENOL SITE
FRANKLIN, INDIANA

MARCH, 1995

07026.08

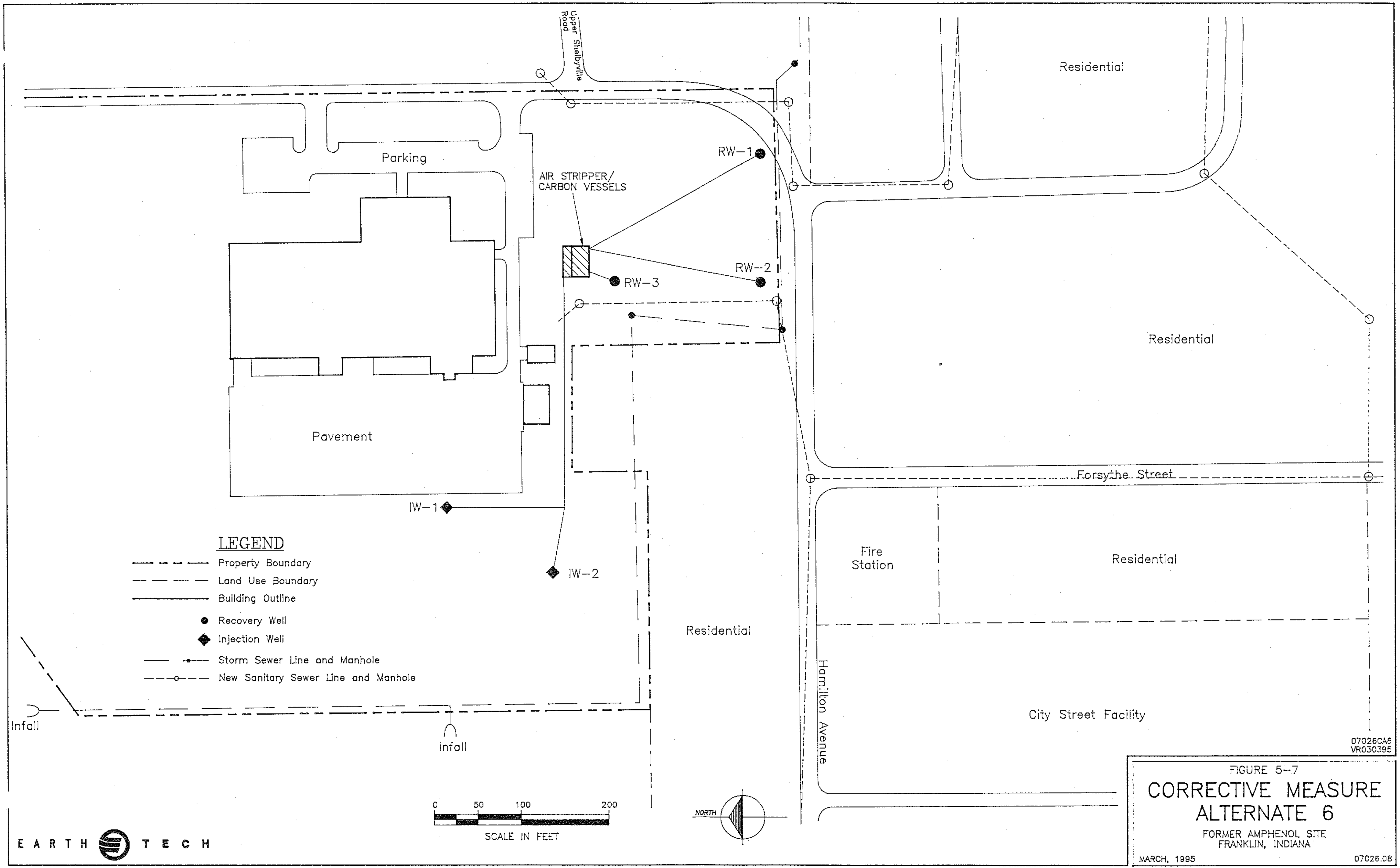


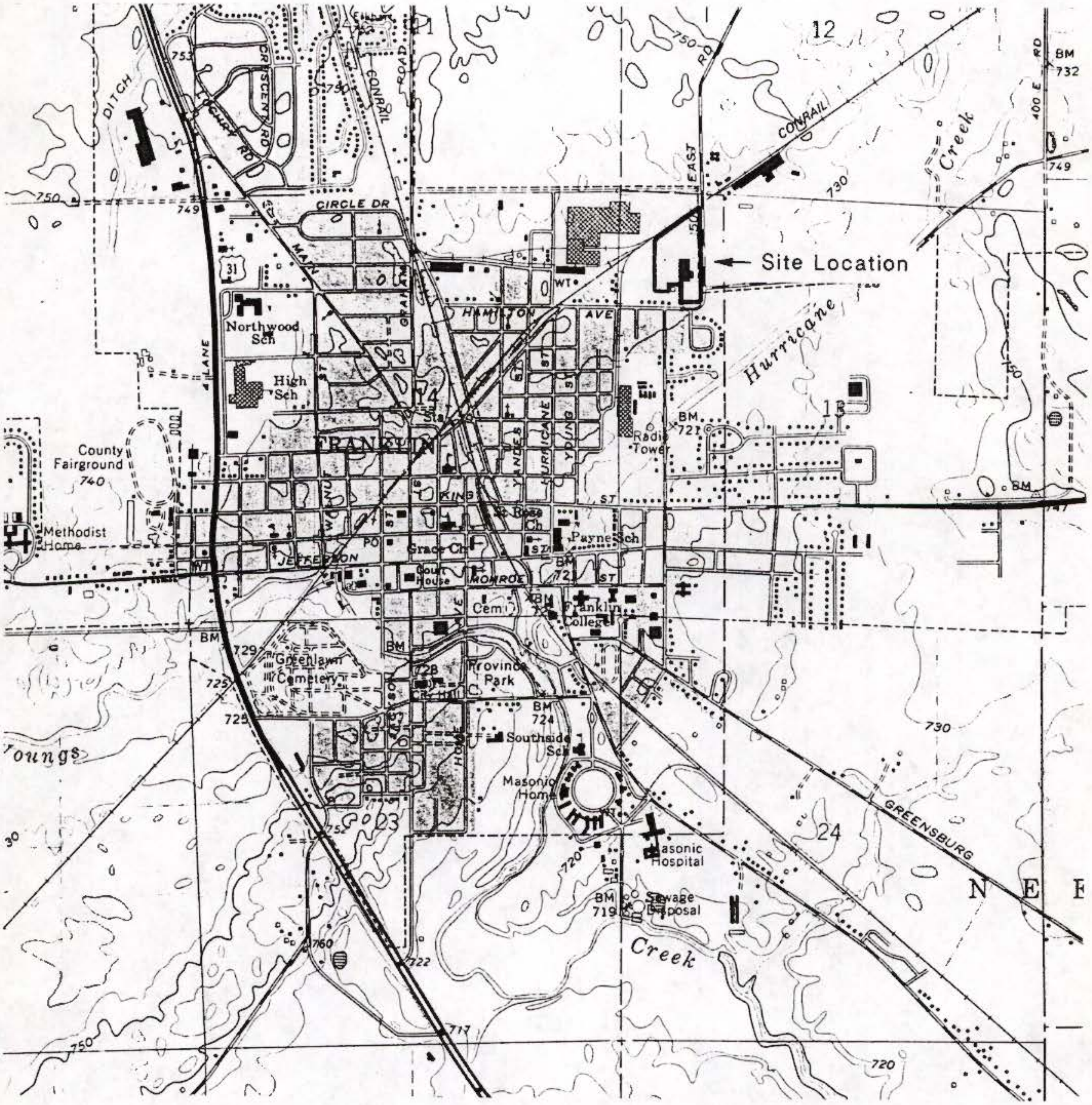
FIGURE 5-7

CORRECTIVE MEASURE ALTERNATE 6

FORMER AMPHENOL SITE
FRANKLIN, INDIANA

MARCH, 1995

07026.08



Base taken from USGS Franklin, Ind. 7.5' topographic quadrangle

N

0 2000 feet

Scale

Figure 1

Site Location Map

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GEOSCIENCES
627 North Morton Street
Bloomington, Indiana 47404 • (812) 336-0972
a member of Summit Environmental Group, Inc.

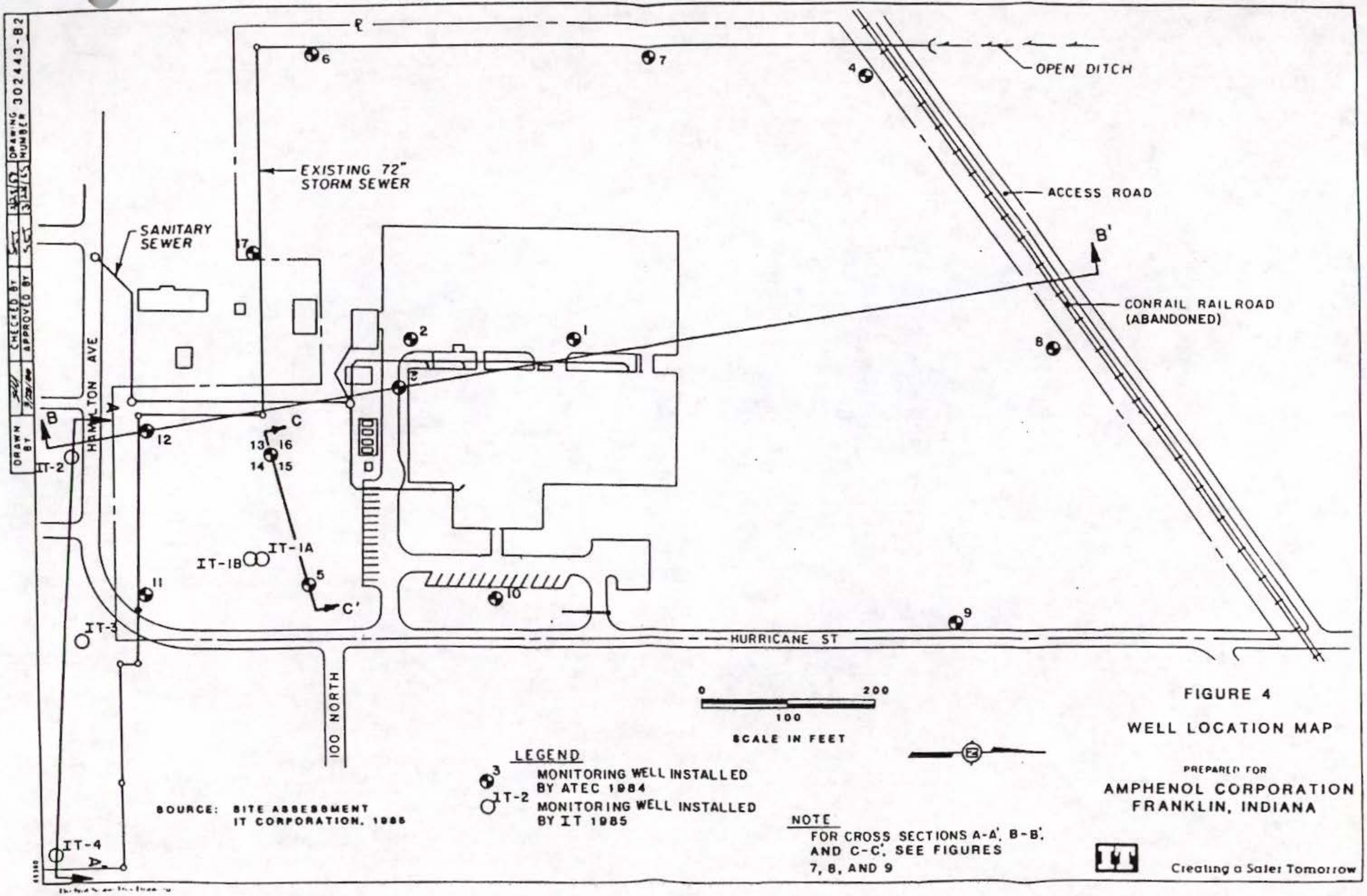


Figure 2. Site map showing locations of 1984-1985 monitoring wells (modified from IT, 1988).

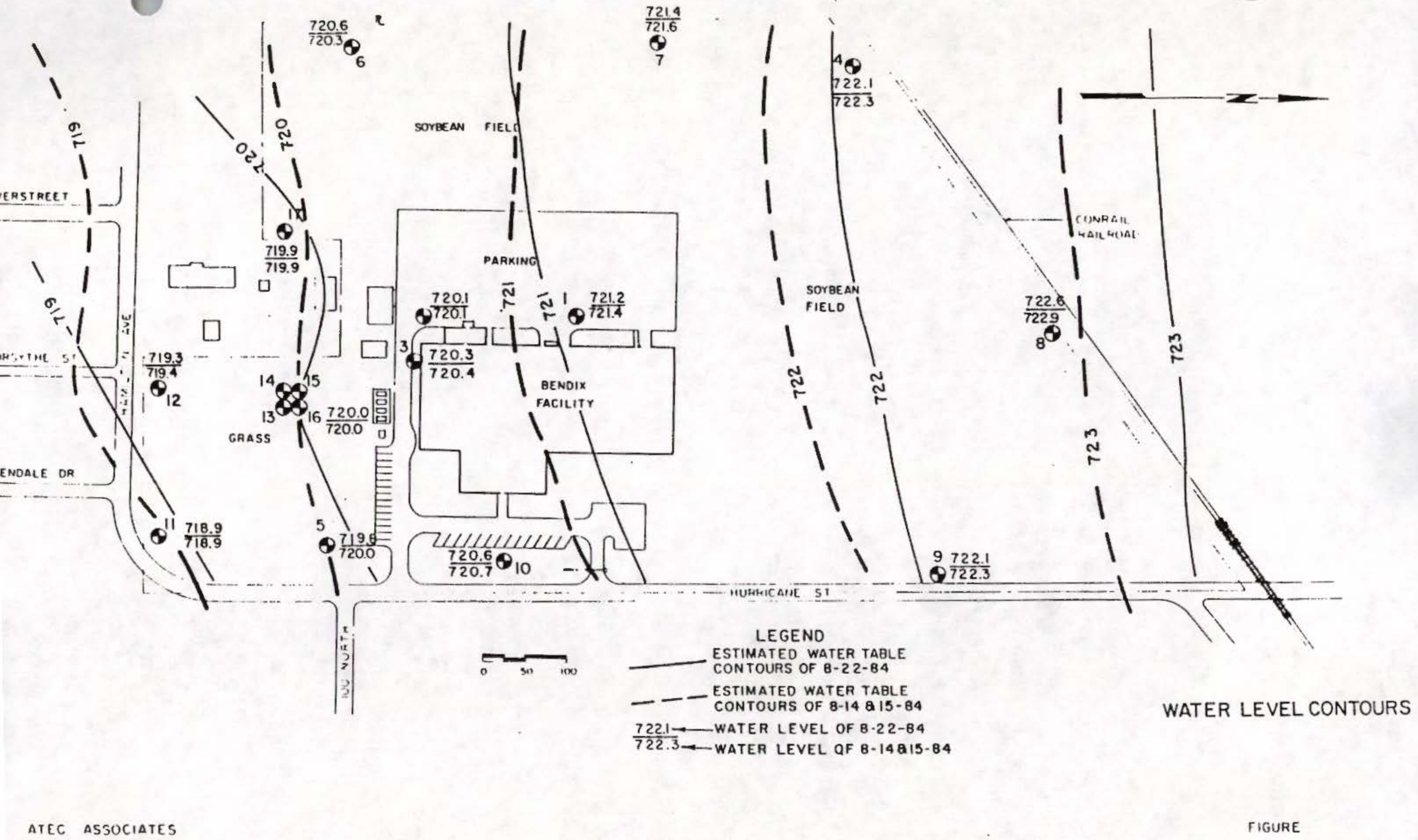


Figure 3. Unit B potentiometric contour map. August, 1984 (modified from ATEC, 1984b).

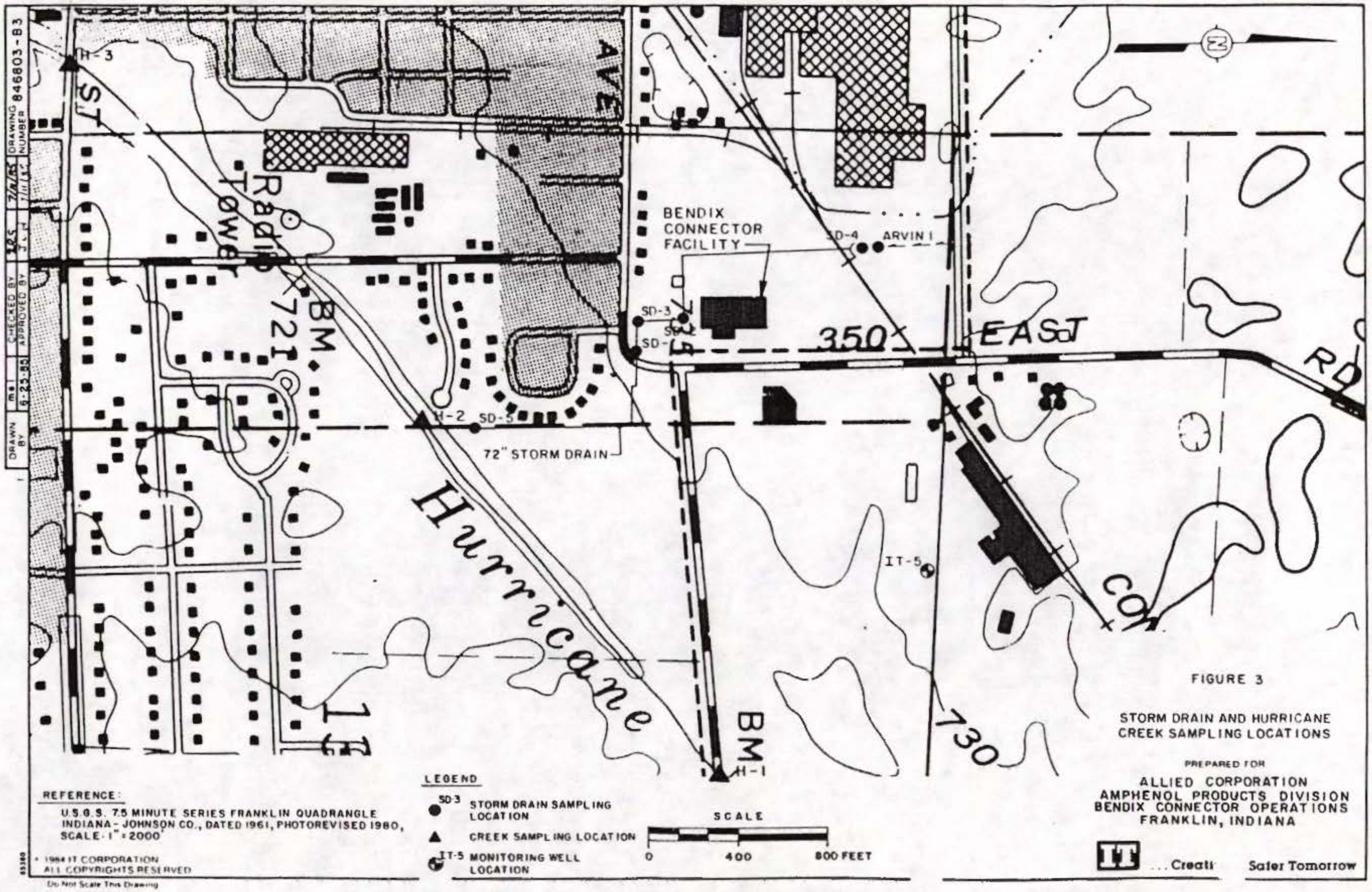
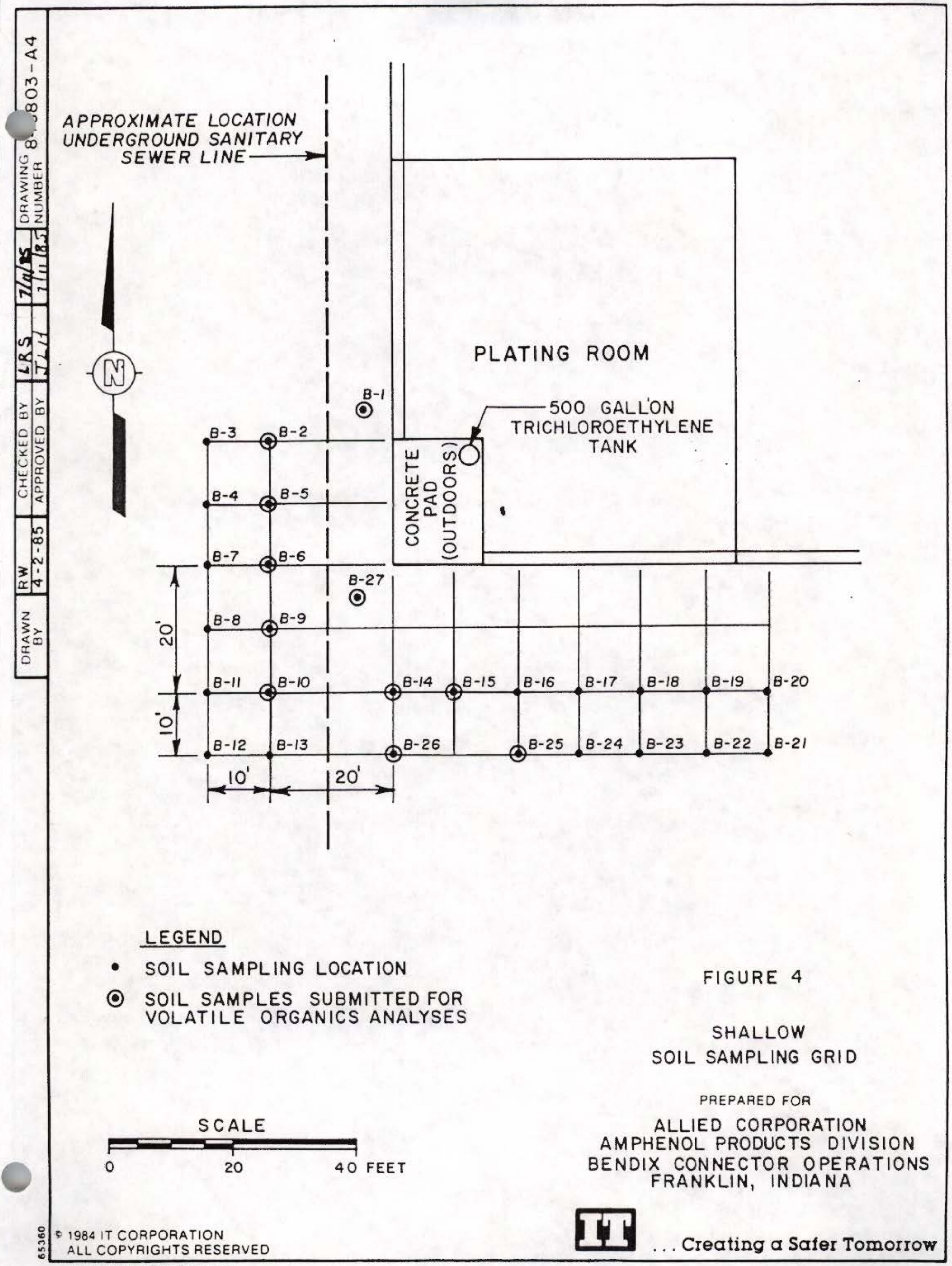


Figure 4. Map showing locations of monitoring well IT-5, and storm sewer and surface water sampling points, February - March, 1985 (modified from IT, 1985).



"Do Not Scale This Drawing"

Figure 5. Map showing locations of soil borings installed during 1985 plating room investigation (modified from IT, 1985).

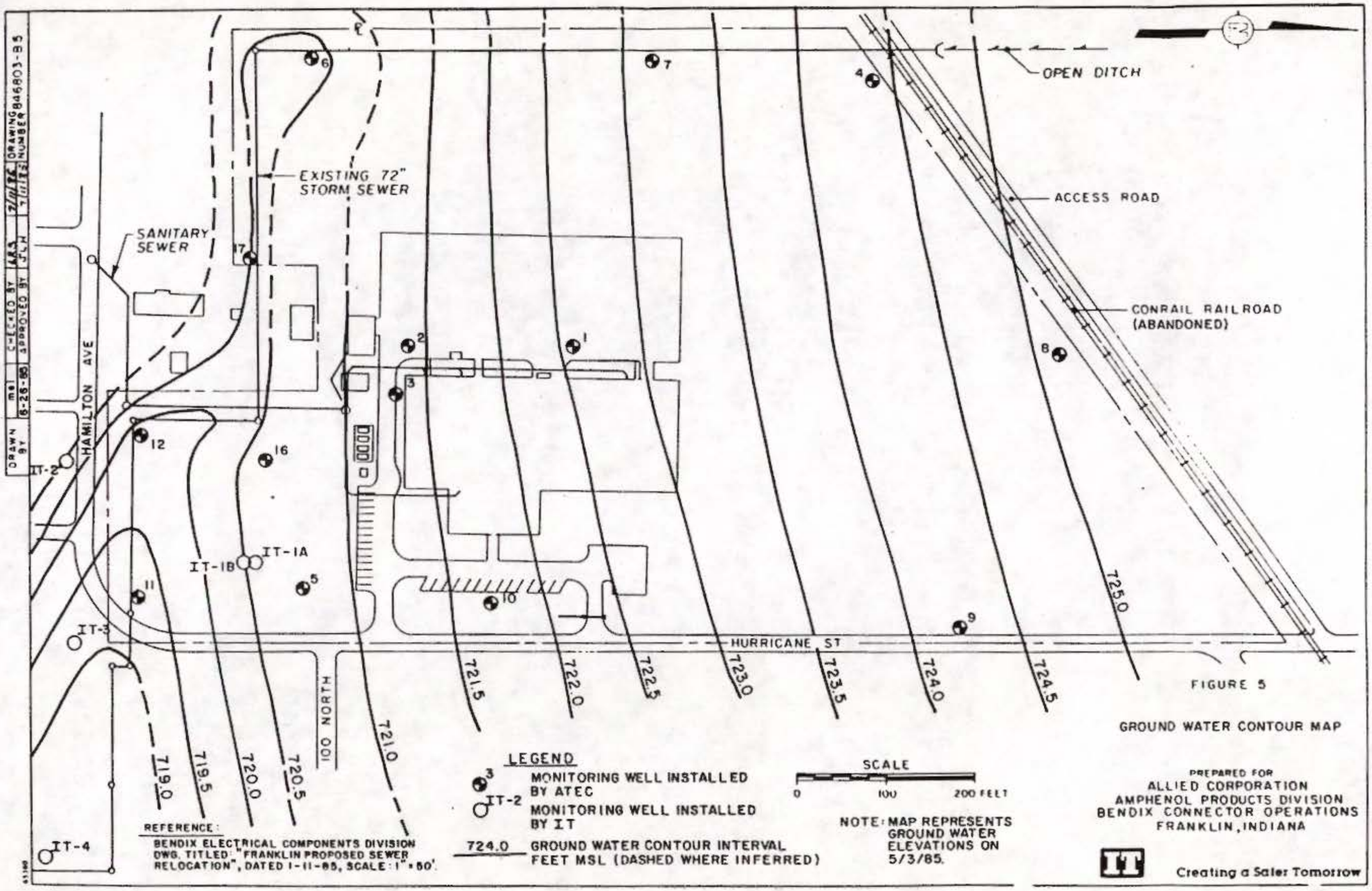


Figure 6. Unit B potentiometric contour map, May, 1985 (modified from IT, 1985).

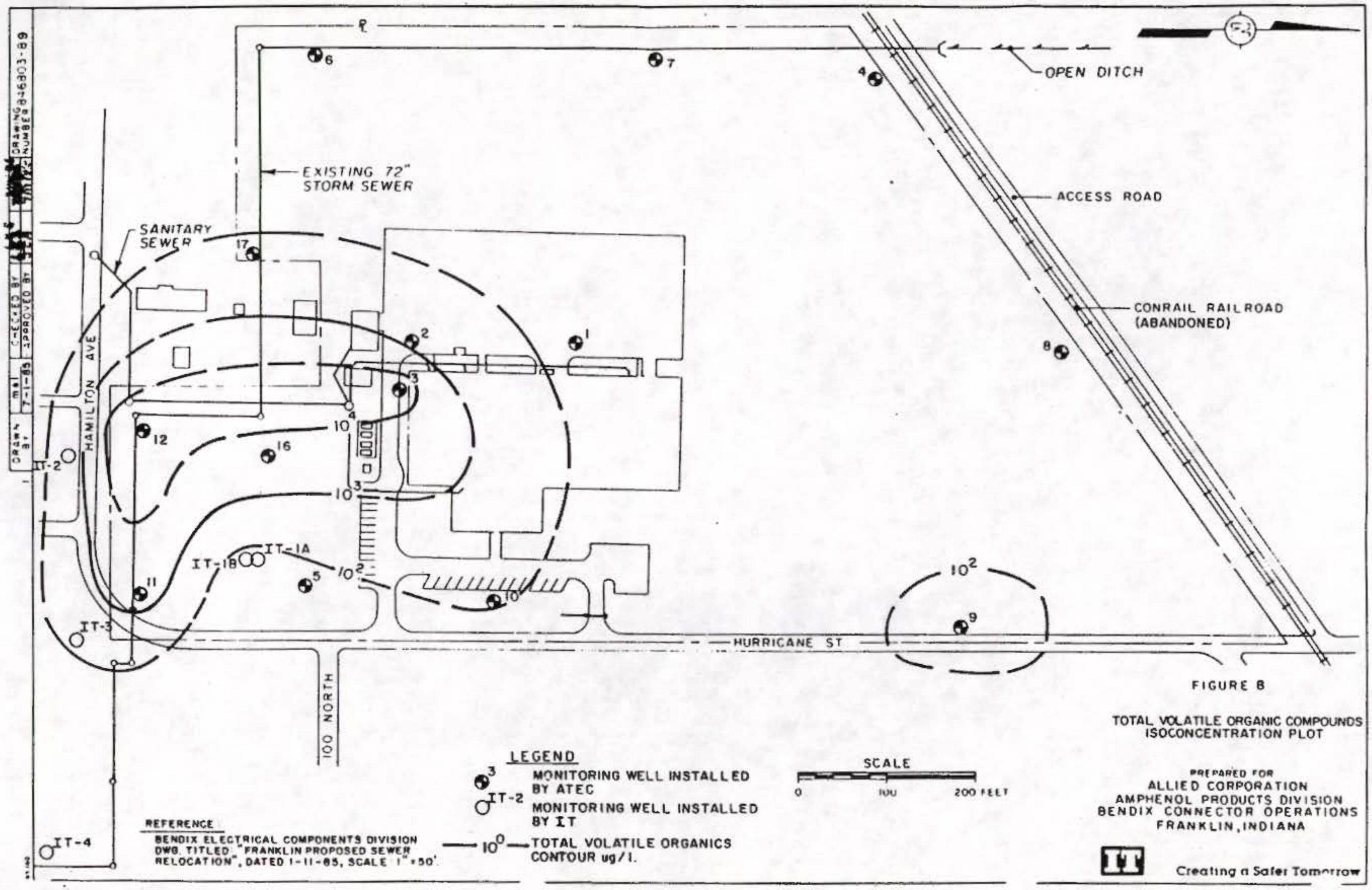
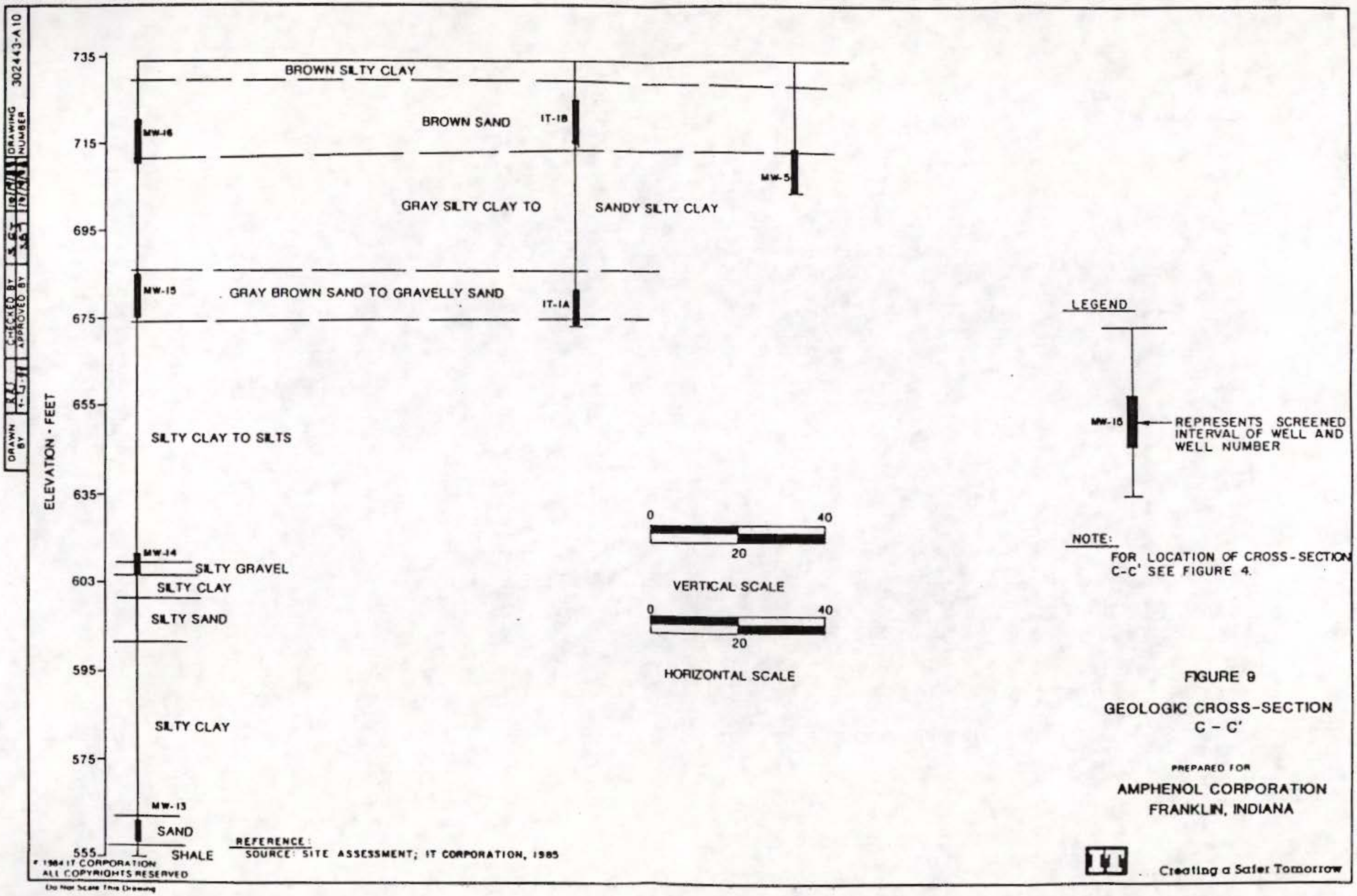
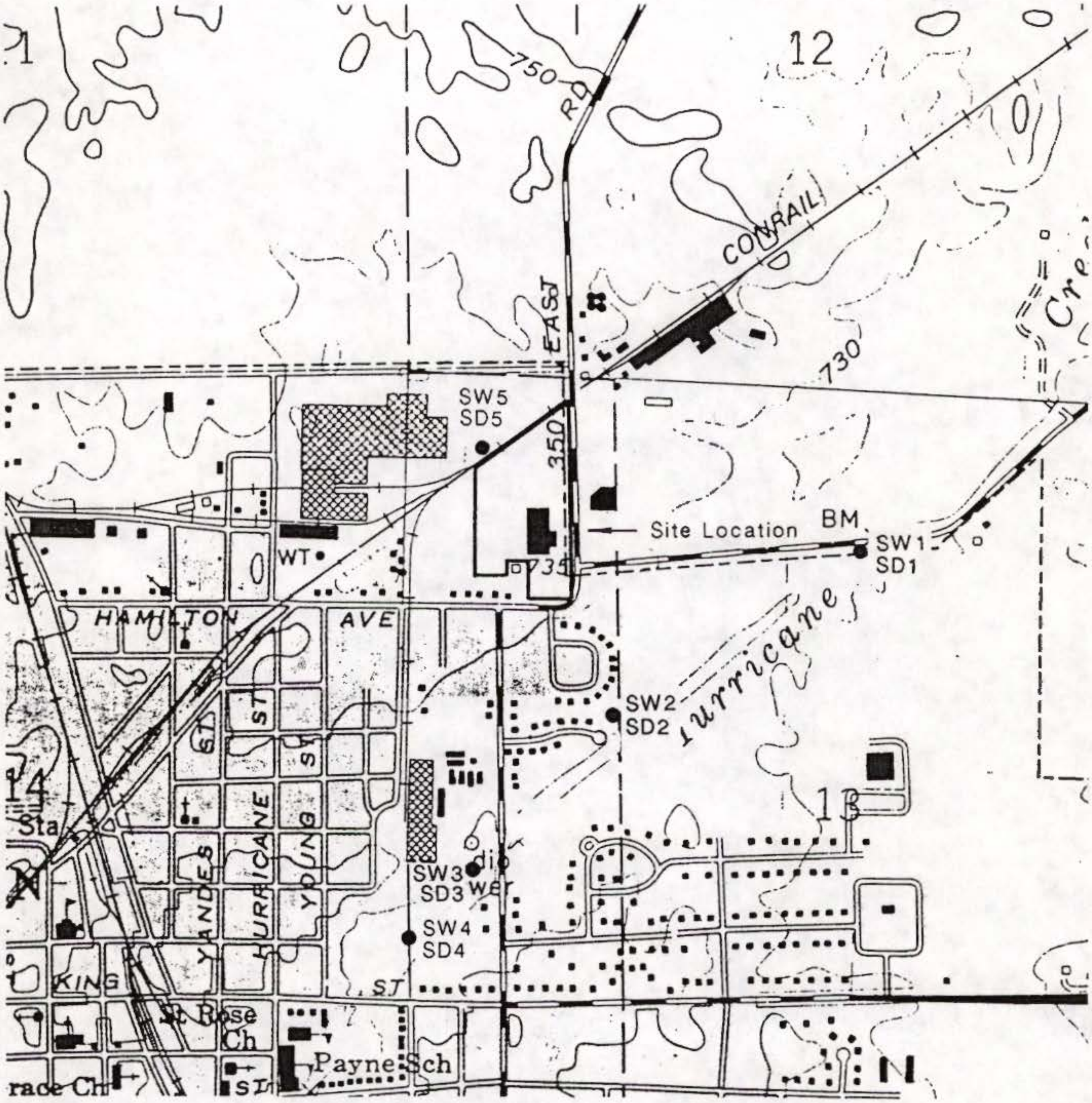


Figure 7. Isoconcentration map of VOCs in ground water, 1985 data (modified from IT, 1985).



REFERENCE:
SOURCE: SITE ASSESSMENT; IT CORPORATION, 1985

Figure 8. Geologic cross section based on 1984-1985 soil boring data (modified from IT, 1985).



Base modified from USGS Franklin, Ind. 7.5' topographic quadrangle

● Sampling Point

Figure 9

RFI surface water/sediment
sampling location map.

N

0 1000 feet

Scale

Revised 5/24/91

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A Summit Environmental Group Company

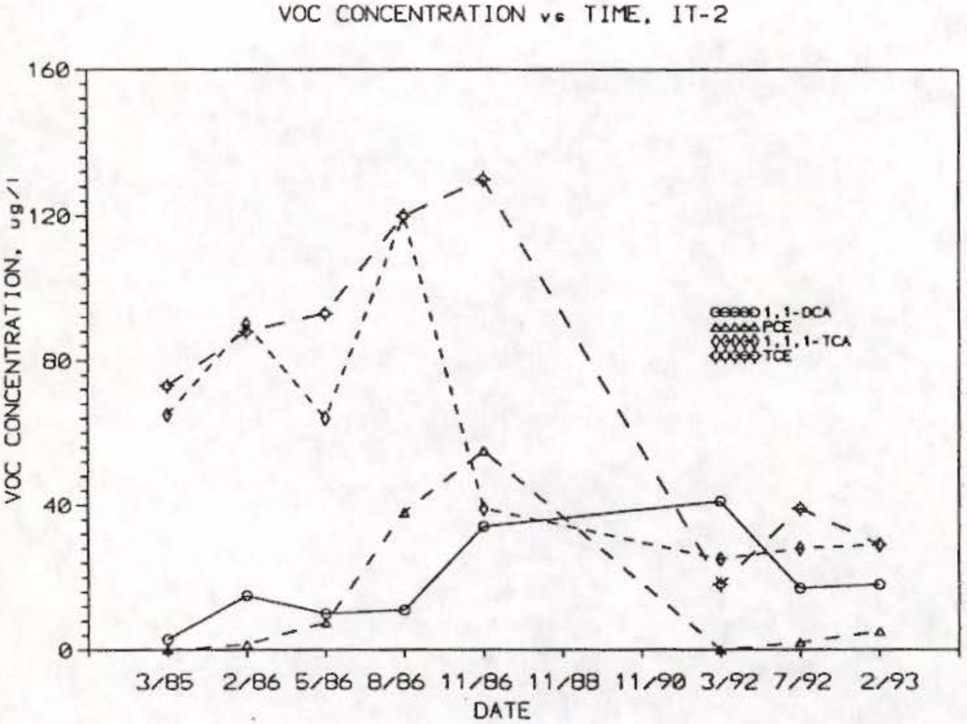


Figure 14a. Plot of VOC concentrations vs time for monitoring well IT-2.

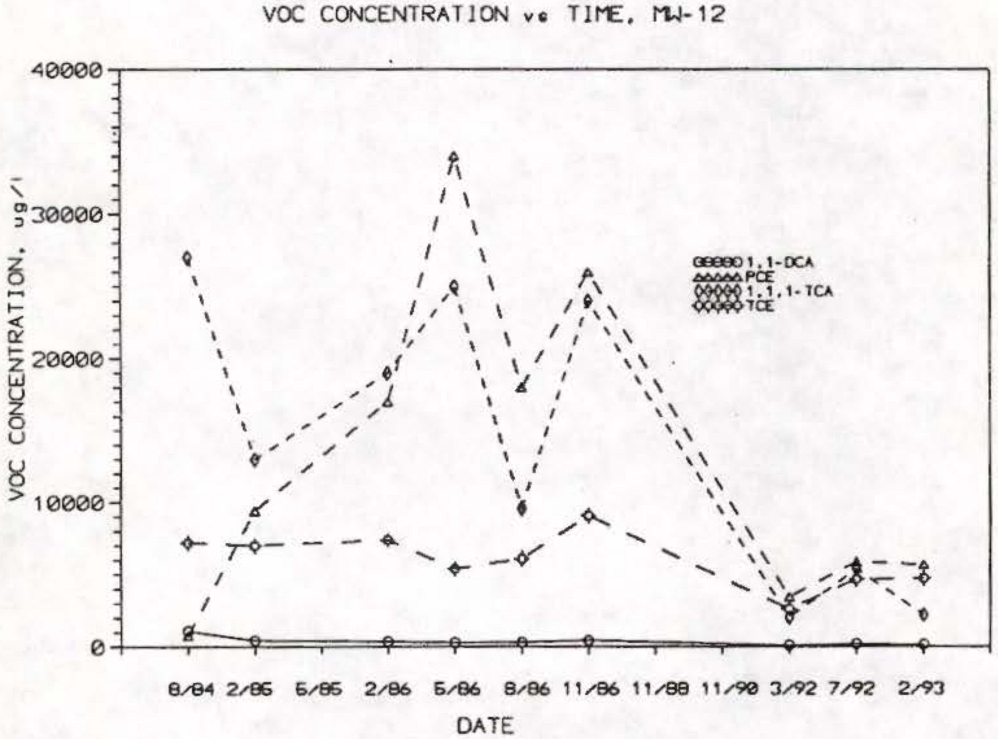
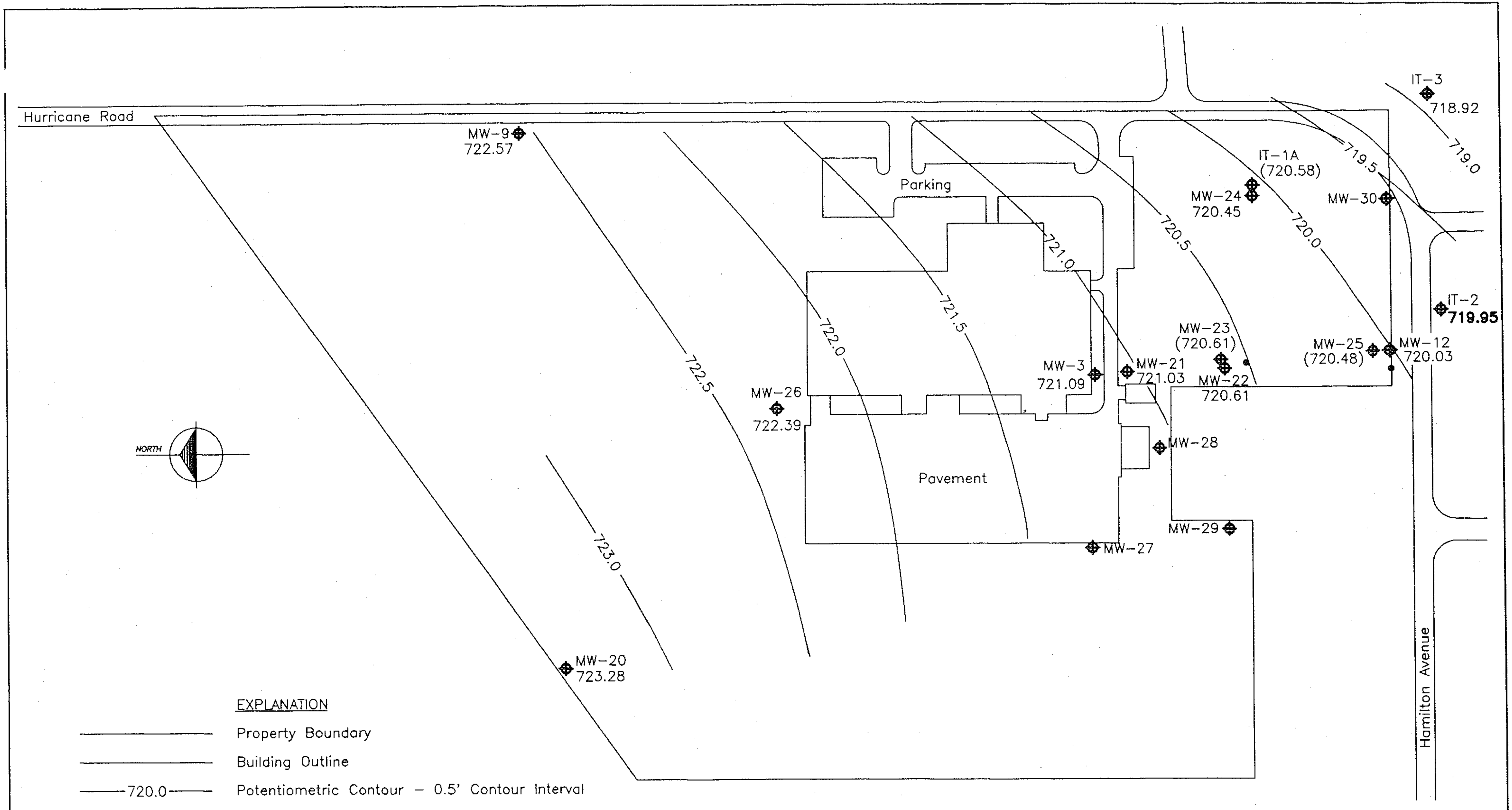


Figure 14b. Plot of VOC concentrations vs time for monitoring well MW-12.



EXPLANATION

———	Property Boundary
———	Building Outline
——720.0——	Potentiometric Contour – 0.5' Contour Interval
MW-20 ⊕	Monitoring Well
723.28	Ground Water Elevation in Feet MSL (Unit D Wells in Parens.)
●	Storm Sewer Manhole

0 100 200
FEET

1:100
7026FG11
NW042193

FIGURE 11
UNIT B POTENTIOMETRIC CONTOUR MAP
FEBRUARY 2, 1993
CURTIS-FRANKLIN
FORMER AMPHENOL RFI/CMS
APRIL 1993
07026.00

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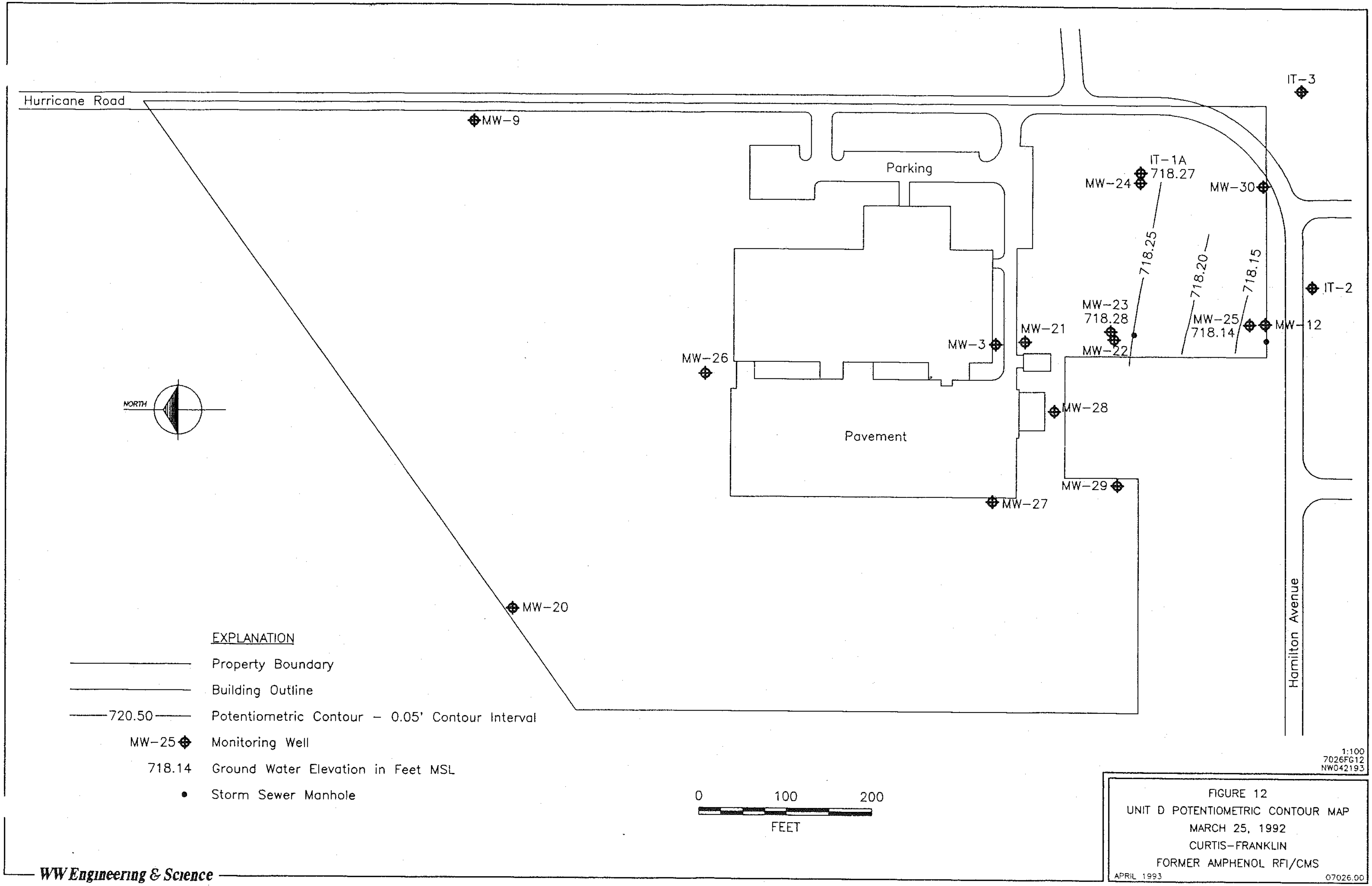
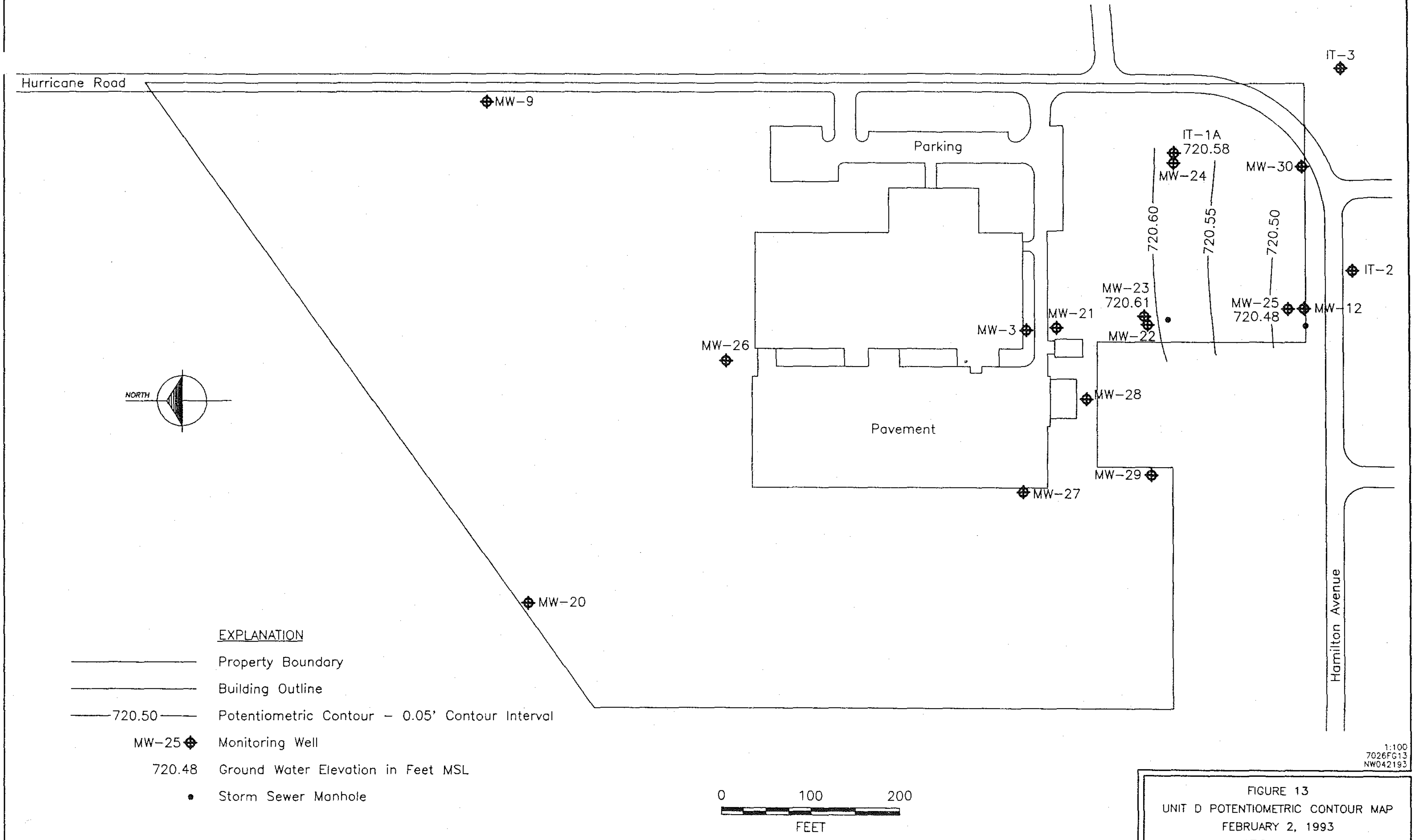


FIGURE 12
UNIT D POTENTIOMETRIC CONTOUR MAP
MARCH 25, 1992
CURTIS-FRANKLIN
FORMER AMPHENOL RFI/CMS



1:100
7026FG13
NW042193

FIGURE 13
UNIT D POTENTIOMETRIC CONTOUR MAP
FEBRUARY 2, 1993
CURTIS-FRANKLIN
FORMER AMPHENOL RFI/CMS

APRIL 1993
07026.00

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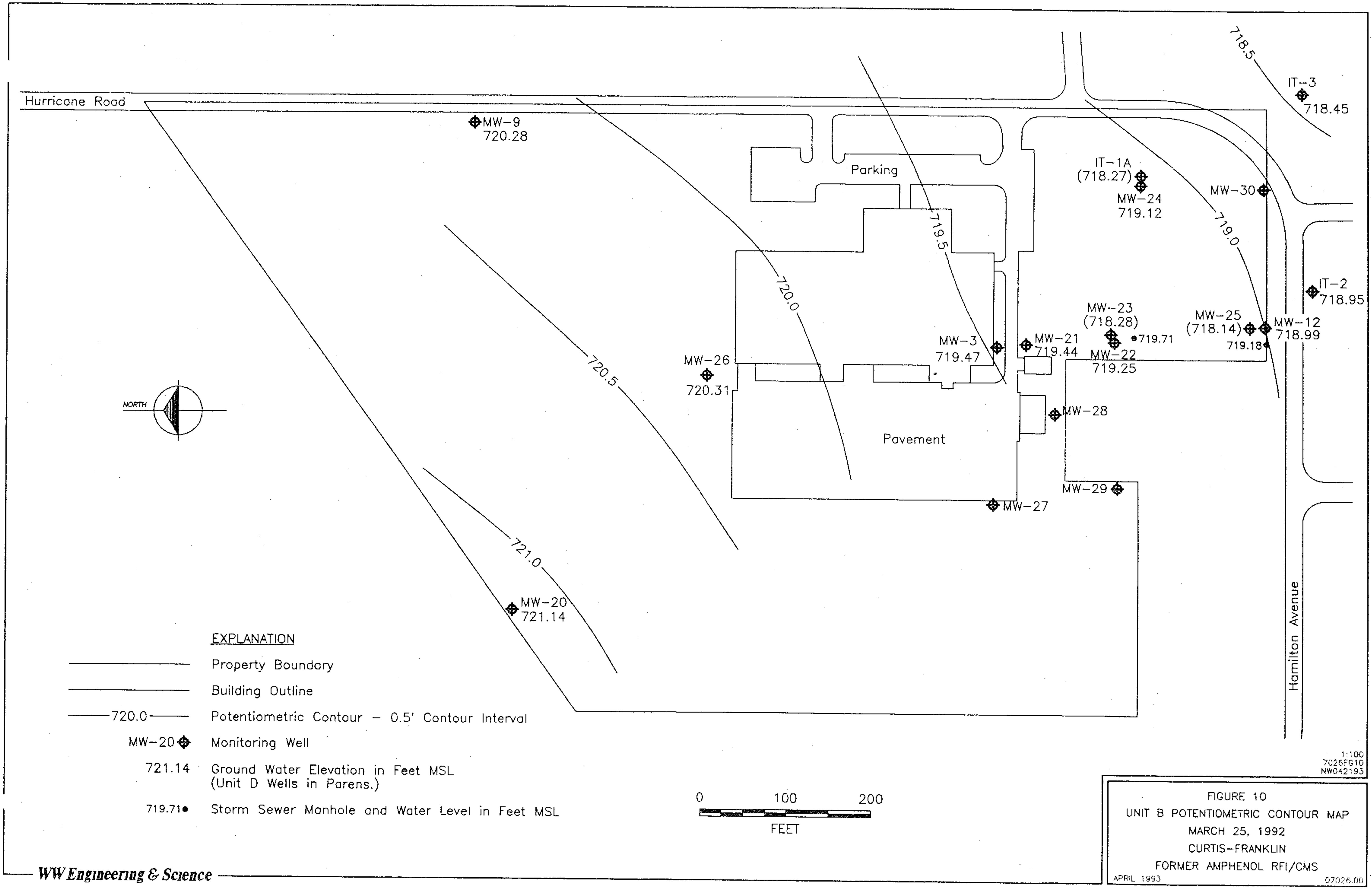


FIGURE 10
UNIT B POTENTIOMETRIC CONTOUR MAP
MARCH 25, 1992
CURTIS-FRANKLIN
FORMER AMPHENOL RFI/CMS

APRIL 1993 07026.00

Table 1. Water Elevation Data.

WELL NUMBER	STATIC WATER LEVEL (elev, feet MSL) 25-Mar 1992	02-Jun 1992	23-Jul 1992	07-Jan 1993	02-Feb 1993	16-Feb 1993	LITHO-STRATIGRAPHIC UNIT
IT-1A	718.27	717.47	717.29	720.10	720.58	720.76	D
IT-2	718.95	719.52	719.75	ND	719.95	719.78	B
IT-3	718.45	718.69	718.90	ND	718.92	716.96	B
MW-3	719.47	720.40	720.68	720.67	721.09	720.88	B
MW-9	720.28	721.57	721.87	ND	722.57	722.41	B
MW-12	718.99	719.62	719.87	ND	720.03	719.89	B
MW-20	721.14	722.52	722.80	ND	723.28	723.04	B
MW-21	719.44	720.31	720.62	720.60	721.03	720.81	B
MW-22	719.25	720.08	720.32	720.31	720.61	720.43	B
MW-23	718.28	717.51	717.33	720.05	720.61	720.73	D
MW-24	719.12	719.80	720.00	720.06	720.45	720.21	B
MW-25	718.14	717.35	717.16	720.08	720.48	720.62	D
MW-26	720.31	721.57	721.89	722.01	722.39	722.21	B
MW-27					721.19	720.96	B
MW-28					720.93	720.71	B
MW-29					720.78	720.53	B
MW-30					719.50	719.36	B
N Storm Sewer MH	719.71	719.71	ND	ND	ND	ND	NA
S Storm Sewer MH	719.18	719.15	ND	ND	ND	ND	NA
E Storm Sewer MH	ND	718.00	ND	ND	ND	ND	NA

T.O.C.=Top of Casing

NA=Not Applicable

ATEC=ATEC Associates, Indianapolis, IN

IT=IT Corporation, Pittsburgh, PA

WWES=WW Engineering & Science, Bloomington, IN

MW-27 through MW-30 installed January 13-15, 1993.

ND=not determined

D=decommissioned

U=not used in the RFI

BL/mke/JDB/b:/Curtis/7026.00/Table3.wk1

Table 2. Soil Samples Selected for Chemical Analyses.

SOIL BORING	SAMPLE DEPTH	SAMPLE NUMBER	COLLECTION METHOD
SB-01	8.0-10.0	FCR-SB-SB01-10.0-01	Hand Auger
	10.0-12.0	FCR-SB-SB01-12.0-01	Hand Auger
SB-02	8.0-10.0	FCR-SB-SB02-10.0-01	Hand Auger
SB-03	4.0- 6.0	FCR-SB-SB03-6.0-01	HSA/3″ Split Spoon
	8.0-10.0	FCR-SB-SB03-10.0-01	HSA/3″ Split Spoon
SB-04	4.0- 6.0	FCR-SB-SB04-6.0-01	HSA/3″ Split Spoon
	8.0-10.0	FCR-SB-SB04-10.0-01	HSA/3″ Split Spoon
SB-05	0.0- 2.0	FCR-SB-SB05-2.0-01	HSA/3″ Split Spoon
SB-06	6.0- 8.0	FCR-SB-SB06-8.0-01	HSA/3″ Split Spoon
	15.0-17.0	FCR-SB-SB06-17.0-01	HSA/3″ Split Spoon
SB-07	6.0- 8.0	FCR-SB-SB07-8.0-01	HSA/3″ Split Spoon
	16.0-18.0	FCR-SB-SB07-18.0-01	HSA/3″ Split Spoon
SB-08	0.0- 2.0	FCR-SB-SB08-2.0-01	HSA/3″ Split Spoon
	17.0-19.0	FCR-SB-SB08-19.0-01	HSA/3″ Split Spoon
SB-09	10.0-12.0	FCR-SB-SB09-12.0-01	HSA/3″ Split Spoon
	16.0-18.0	FCR-SB-SB09-16.0-01	HSA/3″ Split Spoon
MW-20	4.0- 6.0	FCR-SB-MW20-6.0-01	HSA/3″ Split Spoon
	10.0-12.0	FCR-SB-MW20-12.0-01	HSA/3″ Split Spoon
MW-21	10.0-12.0	FCR-SB-MW21-12.0-01	HSA/3″ Split Spoon
	16.0-18.0	FCR-SB-MW21-18.0-01	HSA/3″ Split Spoon
MW-22	8.0-10.0	FCR-SB-MW22-10.0-01	HSA/3″ Split Spoon
	17.0-19.0	FCR-SB-MW22-19.0-01	HSA/3″ Split Spoon
MW-22A	0.0- 2.0	FCR-SB-MW22A-2.0-01	HSA/3″ Split Spoon
MW-22	8.0-10.0	FCR-SB-MW22-10.0-01	HSA/3″ Split Spoon
	17.0-19.0	FCR-SB-MW22-19.0-01	HSA/3″ Split Spoon
MW-23	19.5-21.5	FCR-SB-MW23-21.5-01	HSA/3″ Split Spoon
MW-24	4.0- 6.0	FCR-SB-MW24-6.0-01	HSA/3″ Split Spoon
	13.0-15.0	FCR-SB-MW23-15.0-01	HSA/3″ Split Spoon
MW-25	8.0-10.0	FCR-SB-MW25-10.0-01	HSA/3″ Split Spoon
	33.0-35.0	FCR-SB-MW25-35.0-01	HSA/3″ Split Spoon
MW-26	4.0- 6.0	FCR-SB-MW26-6.0-01	HSA/3″ Split Spoon
	10.0-12.0	FCR-SB-MW26-12.0-01	HSA/3″ Split Spoon
MW-27	13.0-15.0	FCR-SB-MW27-15.0-03	HSA/3″ Split Spoon
	21.0-23.0	FCR-SB-MW27-23.0-03	HSA/3″ Split Spoon
PGP-15	9.0-11.0	FCR-SL-PGP15-11.0-04	Geoprobe

HSA=Hollow Stem Auger

JDB/SBSAMP.WK1

Table 3. RFI Soil Analytical Data.

	SB01-10.0	SB01-12.0	SB02-10.0	SB03-6.0	SB03-10.0
Inorganics (mg/kg)					
Aluminum	6,850*	1,860*	3,180*	18,200	6,130
Antimony	7.30UN	12.3BN	7.60UN	9.20B	7.30U
Arsenic	6.30	4.60	5.90	9.50NS	7.30NS
Barium	34B	8.60B	12.40B	113	29.60B
Beryllium	0.81B	1.10	1.10B	0.62B	0.45B
Cadmium	0.66U	0.63U	0.69U	0.72U	0.67U
Calcium	51,400E	101,000E	99,200E	1,980	19,300
Chromium	8.50	1.10U	1.80B	19.40	10.5
Cobalt	3.90B	2.70B	3.60B	9.30B	5.20B
Copper	516.0	1,970	65.10	12.70	14.80
Cyanide (amenable)	17.8	17.4	0.8	<0.5	<0.5
Cyanide (total)	21.6	20.5	0.94	<0.5	<0.5
Iron	11,700*	6,030*	8,460*	23,000	12,400
Lead	9.3S	5.10	5.90	17	11.90
Magnesium	13,200	30,000	29,100	3,120	11,900
Manganese	417*	225*	267.0*	554	574
Mercury	0.11U	0.11U	0.11U	0.12UN	0.11UN
Nickel	12.90	5.50B	9.70	17.50	20.9
Potassium	1,090B	412B	622B	1,470	748B
Selenium	0.66UN	0.63UN	0.69UN	0.48UN	0.44UN
Silver	1.80U	1.70U	1.80U	1.90U	1.80U
Sodium	101U	96.20U	104U	109U	102B
Thallium	0.44UW	0.42UW	0.46UW	0.72U	0.67U
Vanadium	16.10	6.90B	10.8B	33.80	14.30
Zinc	43.90*	27.70*	31.8	58.30	44.90
Volatile Organics (ug/kg)					
Acetone	27U	27U	35B	23	11U
2-Butanone	27U	27U	27U	12U	11U
Carbon tetrachloride	13U	13U	13U	6U	5U
Chloroform	13U	13U	13U	6U	5U
1,1-Dichloroethane	13U	13U	13U	6U	5U
1,1-Dichloroethylene	NA	NA	NA	NA	NA
1,2-Dichloroethene (total)	13U	13U	13U	6U	5U
1,2-Dichloropropane	13U	13U	13U	6U	5U
Ethylbenzene	13U	13U	13U	6U	5U
Methylene Chloride	64	77	63	8	18
Tetrachloroethene	390	310	370	6U	60
Toluene	13U	13U	13U	6U	5U
1,1,1-Trichloroethane	29	23	26	6U	15
Trichloroethene	140	120	140	6U	52
Xylenes	13U	13U	13U	6U	5U

NA = Not Analyzed

ME/123/7026/2/TABLE5

Table 3, Continued.

	SB04-6.0	SB04-10.0	SB04-10.0	SB05-2.0	SB06-8.0-01
Inorganics (mg/kg)			DUPLICATE		
Aluminum	8,520	4,140	3,520	12,400*	2,760*
Antimony	8.60B	8.10B	10.50B	7.70U	6.80U
Arsenic	5.50NS	4.30N	4.10NS	5.9NS	4.20N
Barium	89.1	19.30B	15.90B	115	12.10B
Beryllium	0.75B	0.89B	0.90B	0.70B	0.49B
Cadmium	0.71U	0.67U	0.68U	0.70U	0.62U
Calcium	28,000	78,400	80,200	2,540	35,400
Chromium	10.0	10.70	5.00	14.4	4.9
Cobalt	8.50B	5.10B	3.80B	11.2B	3.6B
Copper	12.4	12.60	12.70	14.6	9.3
Cyanide (amenable)	<0.5	<0.5	<0.5	<0.5	<0.5
Cyanide (total)	<0.5	<0.5	<0.5	0.58U	0.52U
Iron	12,700	9,100	7,790	14,700	7,160
Lead	34	7.40	7.30	20.5	4.2
Magnesium	10,500	31,800	42,600	1,970	10,900
Manganese	806	621	215	1,000	235
Mercury	0.12UN	0.11UN	0.11UN	0.12U	0.10U
Nickel	12.4	12	7.60B	14.8	8.20B
Potassium	822B	466B	587B	1,310	370B
Selenium	0.47UN	0.45U	0.45UN	0.47UN	0.41N
Silver	1.90U	1.80U	1.80U	1.90U	1.70U
Sodium	111B	126B	116B	106U	94.10U
Thallium	0.71U	0.67U	0.68U	0.47UW	0.41U
Vanadium	18.20	10.40B	9.20B	28.0	7.50B
Zinc	46.10	33.10	25.40	53.3	23.30
Volatile Organics (ug/kg)					
Acetone	21	11J	13	4J	12
2-Butanone	12U	11U	11U	12U	11U
Carbon tetrachloride	6U	6U	6U	6U	5U
Chloroform	6U	6U	6U	6U	5U
1,1-Dichloroethane	6U	6U	6U	6U	5U
1,1-Dichloroethylene	NA	NA	NA	NA	NA
1,2-Dichloroethene (total)	6U	6U	6U	6U	5U
1,2-Dichloropropane	6U	6U	6U	6U	5U
Ethylbenzene	6U	6U	6U	6U	5U
Methylene Chloride	11	18	2J	6U	16
Tetrachloroethene	2J	16	6	2J	25
Toluene	NA	6U	6U	6U	5U
1,1,1-Trichloroethane	6U	8	3J	6U	5U
Trichloroethene	6U	10	5J	6U	7
Xylenes	6U	6U	6U	6U	5U

NA = Not Analyzed

ME/123/7026/2/TABLE5

Table 3, Continued.

	SB06-8.0	SB06-17.0	SB07-8.0	SB07-18.0	SB08-2.0
Inorganics (mg/kg)	DUPLICATE				
Aluminum	4,950*	1,760*	1,580E	2,520E	11,000*
Antimony	6.80U	7.50U	3.60UN	3.60UN	7.60U
Arsenic	6.40NS	2.2BN	2.50W	1.70B	3.80N
Barium	21.80B	7.0B	7.60B	8.50B	105
Beryllium	0.29B	1.1B	0.21U	0.21U	0.62B
Cadmium	0.62U	0.68U	0.42UN	0.43UN	0.69U
Calcium	1,610	109,000	77,000	138,000	1,980
Chromium	8.70	1.10U	4.20*	6.50*	13.40
Cobalt	4.10B	2.60B	1.20B	1.50B	8.60B
Copper	11.9	7.40	19.10	18.00	9.30
Cyanide (amenable)	<0.5	<0.5	<0.5	<0.5	<0.5
Cyanide (total)	0.52U	0.57U	<0.5	<0.5	0.57U
Iron	9,430	4,390	4,520E	5,420E	13,700
Lead	6.0	3.70S	3.40NW*	6.40N*+	15.20
Magnesium	1,800	26,500	17,100	43,800	1,990
Manganese	325	189	174EN*	165EN*	754
Mercury	0.10U	0.11U	0.11U	0.11U	2.30
Nickel	11.3	4.40B	5.20B	6.30B	13.50
Potassium	710B	426B	228B	516B	939B
Selenium	0.41UN	0.5UNW	0.42U	0.43UW	0.46UN
Silver	1.60U	1.8U	0.42U	0.45B	1.80U
Sodium	93.80U	104U	171B	271B	105U
Thallium	0.41	0.46U	0.42U	0.43U	0.46UW
Vanadium	11.40	5.1B	5.60B	10.50B	21.80
Zinc	31.40	14.2	15.40	19.50B	42.7
Volatile Organics (ug/kg)					
Acetone	10U	59U	26U	1,300U	11U
2-Butanone	10U	59U	13U	1,300U	11U
Carbon tetrachloride	5U	29U	13U	670U	6U
Chloroform	5U	29U	13U	670U	6U
1,1-Dichloroethane	5U	29U	13U	670U	6U
1,1-Dichloroethylene	NA	NA	NA	NA	NA
1,2-Dichloroethene (total)	5U	29U	13U	670U	6U
1,2-Dichloropropane	5U	29U	13U	670U	6U
Ethylbenzene	5U	29U	13U	670U	6U
Methylene Chloride	5U	84	13U	670U	6U
Tetrachloroethene	37	1,100	330	17,000	53
Toluene	5U	29U	13U	670U	6U
1,1,1-Trichloroethane	1J	140	13U	670U	6U
Trichloroethene	17	720	19	440J	17
Xylenes	5U	29U	13U	670U	6U

NA = Not Analyzed

Table 3, Continued.

	SB08-19.0	SB09-12.0	SB09-18.0	SB09-18.0	MW20-6.0
Inorganics (mg/kg)				DUPLICATE	
Aluminum	2,420*	2,970E	2,160E	2,370E	15,200
Antimony	7.40U	3.60UN	4.20UN	4UN	7.90U
Arsenic	2.60N	3.80	2.20B	2.20BS	4.10NS
Barium	9.30B	10.50B	7.60	8.60B	83.10
Beryllium	1.20	0.21U	0.25U	0.24U	0.66B
Cadmium	0.67U	2.40N	2.50N	13.20N	0.72U
Calcium	115,000	88,800	105,000	103,000	4,180
Chromium	1.90B	7.10*	12.80*	11.90*	20.70
Cobalt	3.00B	1.90B	1.90B	1.60B	8.40B
Copper	13.70	19.40	106	137.0	14.0
Cyanide (amenable)	<0.5	<0.5	<0.5	18.4	<0.5
Cyanide (total)	0.56U	<0.5	<0.5	18.4	<0.5
Iron	6,280	6,480E	5,500E	5,980E	20,100
Lead	5.50	5.10N*	4.30NS*	5.90N*	16.5
Magnesium	26,400	31,800	26,800	28,500	3,820
Manganese	188	235.0EN*	165EN*	181EN*	350
Mercury	0.11U	0.11U	0.12U	0.12U	0.11UN
Nickel	8.30B	9.90	30.50	38.30	17.1
Potassium	510B	560B	372B	360.0B	1,120B
Selenium	0.45UN	0.42UW	0.50UW	0.47UW	0.48UN
Silver	1.80U	0.42U	0.50U	1.20B	1.90U
Sodium	102U	244B	219B	224B	109U
Thallium	0.45U	0.42	0.50U	0.47U	0.72U
Vanadium	8.00B	10.0B	7.70B	8.20B	27.80
Zinc	33.9	21.60	80.60	88.40	77.30
Volatile Organics (ug/kg)					
Acetone	680J	54U	1,500U	1,400U	9J
2-Butanone	2,900U	27U	1,500U	1,400U	10U
Carbon tetrachloride	1,400U	27U	740U	690U	5U
Chloroform	1,400U	27U	740U	690U	5U
1,1-Dichloroethane	1,400U	27U	740U	690U	5U
1,1-Dichloroethylene	NA	NA	NA	NA	NA
1,2-Dichloroethene (total)	1,400U	27U	740U	690U	5U
1,2-Dichloropropane	1,400U	27U	740U	690U	5U
Ethylbenzene	1,400U	27U	740U	690U	5U
Methylene Chloride	510BJ	27U	740U	690U	5U
Tetrachloroethene	36,000	550	15,000	10,000.0	5U
Toluene	1,400U	27U	740U	690U	3J
1,1,1-Trichloroethane	270J	10J	650J	690J	5U
Trichloroethene	3,100	150	3,500	2,500	5U
Xylenes	1,400U	27U	740U	690U	5U

NA = Not Analyzed

ME/123/7026/2/TABLE5

Table 3, Continued.

	MW20-12.0	MW21-12.0	MW21-12.0	MW21-18.0	MW22A-2.0
Inorganics (mg/kg)			DUPLICATE		
Aluminum	2,220	2,610E	2,380E	1,990E	6,890*
Antimony	7.40U	3.60UN	3.60UN	4.10UN	7.50U
Arsenic	2.80NS	3.20	4.60	2.30B	7.40N
Barium	26.6B	8.80B	15.20B	6.10B	58.70
Beryllium	0.49B	0.21U	0.21B	0.24U	0.96B
Cadmium	0.67U	0.42UN	0.42UN	0.48UN	0.68U
Calcium	37,600	146,000	139,000	91,200.0	66,300
Chromium	3.70	7.80*	6.30*	6.00*	6.20
Cobalt	3.40B	1.80B	1.80B	2.10B	6.20B
Copper	11.20	16.50	21.0	27.40	14.2
Cyanide (amenable)	<0.5	1.0	<0.5	<0.5	<0.5
Cyanide (total)	<0.5	1.0	<0.5	<0.5	<0.5
Iron	6,770.0	5,950E	6,580.0E	5,440.0E	11,800.0
Lead	6.70	11.40NS*	4.80N*	3.30N*	52.90W
Magnesium	20,100.0	47,900	59,900	24,400	17,110
Manganese	226.0	241.0EN*	426EN*	137EN*	491
Mercury	0.11UN	0.10U	0.11U	0.12U	0.11U
Nickel	9.10	8.30B	11.10	15.80	10.5
Potassium	400.0B	528B	479B	267B	811B
Selenium	0.45UN	0.42UW	0.42UW	0.48UW	0.45UN
Silver	1.80U	0.42U	0.42U	0.48U	1.80U
Sodium	117.0B	281B	238B	203B	103U
Thallium	0.67U	0.42U	0.42UW	0.48U	0.45U
Vanadium	7.60B	9.80B	9.10B	7.20B	16.0
Zinc	25.0	18.90	25.90	23.10	91.0
Volatile Organics (ug/kg)					
Acetone	9J	53U	53U	1,500U	6BJ
2-Butanone	10U	53U	53U	1,500U	11U
Carbon tetrachloride	5U	26U	27U	740U	6U
Chloroform	5U	26U	27U	740U	6U
1,1-Dichloroethane	5U	26U	27U	740U	6U
1,1-Dichloroethylene	NA	NA	NA	NA	NA
1,2-Dichloroethene (total)	5U	26U	27U	740U	6U
1,2-Dichloropropane	5U	26U	27U	740U	6U
Ethylbenzene	5U	26U	27U	740U	6U
Methylene Chloride	5U	26U	27U	740U	6U
Tetrachloroethene	5U	780	160	25,000	36
Toluene	5	26U	27U	740U	6U
1,1,1-Trichloroethane	5U	26U	27U	750	6U
Trichloroethene	5U	300	52	5,300	2J
Xylenes	5U	26U	27U	740U	6U

NA = Not Analyzed

Table 3, Continued.

	MW22-10.0	M22-19.0	MW23-21.5	MW24-6.0	MW24-15.0
Inorganics (mg/kg)					
Aluminum	2,970*	2,300*	5,650*	1,400	2,850
Antimony	12.4B	7.50U	7.10U	6.80U	10.70B
Arsenic	6.8N	2.20BN	5.00N	2.0BN	1.9BNS
Barium	11.5B	8.20B	38.4B	5.9B	13.3B
Beryllium	1.50	1.00B	1.10	0.69B	1.2
Cadmium	0.63U	0.68U	0.65U	0.62U	0.63U
Calcium	163,000	102,000	93,000	66,900	106,000
Chromium	1.00U	1.10U	3.60	1.00U	1.60B
Cobalt	5.50B	3.20B	8.20B	2.10B	3.70B
Copper	11.90	15.70	13.70	5.90	15.30
Cyanide (amenable)	<0.5	<0.5	<0.5	<0.5	<0.5
Cyanide (total)	<0.5	<0.5	<0.5	<0.5	<0.5
Iron	10,800	5,450	9,130	4,090	8,360
Lead	11.20	4.10S	11.10S	4.70	10.9
Magnesium	43,500	28,000	27,500	16,900	29,600
Manganese	290	189	292	145	229
Mercury	0.10U	0.11U	0.11U	0.10UN	0.10UN
Nickel	8.20B	6.30B	13.2	4.40B	9.40
Potassium	721B	512.0B	1,250	238B	568B
Selenium	0.4UNW	0.5UNW	0.4UNW	0.41UN	0.42UN
Silver	1.70U	1.80U	1.70U	1.70U	1.70U
Sodium	146B	104U	98.20U	94U	116B
Thallium	0.42U	0.46U	0.43U	0.62U	0.63U
Vanadium	10.40	7.10B	13.40	3.80B	8.20B
Zinc	33.60	22.90	35	16.50	28.70
Volatile Organics (ug/kg)					
Acetone	27U	12,000U	1300U	10U	19
2-Butanone	27U	12,000U	1300U	10U	11U
Carbon tetrachloride	13U	6,200U	670U	5U	5U
Chloroform	13U	6,200U	670U	5U	5U
1,1-Dichloroethane	13U	6,200U	3,100	5U	5U
1,1-Dichloroethylene	NA	NA	NA	NA	NA
1,2-Dichloroethene (total)	13U	6,200U	670U	5U	5U
1,2-Dichloropropane	13U	6,200U	670U	5U	5U
Ethylbenzene	13U	6,200U	670U	5U	5U
Methylene Chloride	13U	13,000.0B	1,500	2J	27
Tetrachloroethene	300	120,000	280J	2J	6
Toluene	13U	6,200	670U	5U	5U
1,1,1-Trichloroethane	13U	6,200U	390J	5U	10
Trichloroethene	43	1,600J	460J	5U	38
Xylenes	13U	6,200U	670U	5U	5U

NA = Not Analyzed

Table 3, Continued.

	MW25-10.0	MW25-35.0	MW26-6.0	MW26-12.0	MW-27-15.0
Inorganics (mg/kg)					
Aluminum	2,580*	6,100E	12,500	2,440	1960
Antimony	8.50B	3.80UN	7.60U	10.40B	6.4UN
Arsenic	6.3N	8.00S	6.70N	2.20NS	0.65BWN
Barium	10.6B	59.70	49.80	15.90B	7.9B
Beryllium	1.30	0.39B	0.57B	0.97B	1.1
Cadmium	0.63U	0.44UN	0.69U	0.64U	0.44U
Calcium	143,000	111,000	1,620	94,700	91200
Chromium	1.10U	11.4*	15.80	1.10U	4.0
Cobalt	4.80B	5.00B	8.00B	3.30B	1.8B
Copper	10.10	35.80	22.80	10.90	22.2*
Cyanide (amenable)	<0.5	<0.5	<0.5	<0.5	<0.5
Cyanide (total)	0.53U	<0.5	<0.5	<0.5	0.55U
Iron	8,400	12,800E	20,500	6,050	4470
Lead	12	9.00NW*	20.30	4.80	3.6*
Magnesium	39,200	37,400	2,560	33,500	22400
Manganese	303	328EN*	687	217	149
Mercury	0.11U	0.11U	0.12UN	0.11UN	0.11U
Nickel	6.20B	19.40	18.90	6.40B	7.5B
Potassium	399B	1,390	921B	540B	435B
Selenium	0.44BMNW	0.44U	0.46UN	0.43UN	0.22UW
Silver	1.70U	0.44U	1.80U	1.70U	1.4B
Sodium	95.60U	275B	105U	142B	111U
Thallium	0.42U	0.44U	0.69U	0.64U	0.66UN
Vanadium	9.5B	15.60	24.3	6.90B	6.6B
Zinc	30	44.50	56.2	22.90	16.0*
Volatile Organics (ug/kg)					
Acetone	10U	20	19	28	680BJ
2-Butanone	10U	11U	11U	11U	1400U
Carbon tetrachloride	5U	5U	6U	5U	1400U
Chloroform	5U	5U	6U	5U	1400U
1,1-Dichloroethane	5U	5U	6U	5U	1400U
1,1-Dichloroethylene	NA	NA	NA	NA	1400U
1,2-Dichloroethene (total)	5U	5U	6U	5U	1400U
1,2-Dichloropropane	5U	5U	6U	5U	1400U
Ethylbenzene	5U	5U	6U	5U	1400U
Methylene Chloride	5U	41	6U	5U	660J
Tetrachloroethene	44	12	6U	5U	17000
Toluene	5U	5U	6U	5U	1400U
1,1,1-Trichloroethane	5U	5U	6U	5U	1400U
Trichloroethene	46	5U	6U	5U	1400U
Xylenes	5U	5U	6U	5U	1400U

NA = Not Analyzed

Table 3, Continued.

	·MW27-15.0	MW27-23.0	PGP15-11.0	PGP16-11.0	PGP16-11.0
Inorganics (mg/kg)	DUPLICATE				DUPLICATE
Aluminum	1902	2100	NA	NA	NA
Antimony	6.4U	9.7UN	NA	NA	NA
Arsenic	0.78B	0.65BN	NA	NA	NA
Barium	8.4B	8.8B	NA	NA	NA
Beryllium	1.2	1.6	NA	NA	NA
Cadmium	0.44U	0.49B	NA	NA	NA
Calcium	9345	80600	NA	NA	NA
Chromium	.3	3.5	NA	NA	NA
Cobalt	1.6B	1.2U	NA	NA	NA
Copper	102	70.7*	NA	NA	NA
Cyanide (amenable)	<0.5	<0.5	NA	NA	NA
Cyanide (total)	0.55U	0.58U	NA	NA	NA
Iron	4730	4490	NA	NA	NA
Lead	8.5	5.8*	NA	NA	NA
Magnesium	22135	21900	NA	NA	NA
Manganese	149	141	NA	NA	NA
Mercury	0.11U	0.12U	NA	NA	NA
Nickel	15.2	14.6	NA	NA	NA
Potassium	395B	411B	NA	NA	NA
Selenium	0.22U	0.27B	NA	NA	NA
Silver	1.8B	1.7B	NA	NA	NA
Sodium	111U	117U	NA	NA	NA
Thallium	0.66U	0.7UN	NA	NA	NA
Vanadium	5.7B	6.4B	NA	NA	NA
Zinc	53.1	30.9*	NA	NA	NA
Volatile Organics (ug/kg)					
Acetone	500BJ	59B	78UJ	11U	95
2-Butanone	390J	7J	11UJ	11U	11U
Carbon tetrachloride	1300U	12U	5UJ	5U	5U
Chloroform	1300U	3J	5UJ	5U	5U
1,1-Dichloroethane	1300U	12U	5UJ	5U	5U
1,1-Dichloroethylene	1300U	12U	5UJ	5U	5U
1,2-Dichloroethene (total)	1300U	12U	5UJ	5U	5U
1,2-Dichloropropane	1300U	12U	5UJ	5U	5U
Ethylbenzene	1300U	12U	4J	5U	5U
Methylene Chloride	1300U	2J	16UJ	6	29
Tetrachloroethene	25000	100	85J	5	9
Toluene	1300U	12U	7J	5U	5J
1,1,1-Trichloroethane	1300U	3J	5UJ	11	16
Trichloroethene	1300U	12U	10J	94	140
Xylenes	1300U	2J	34J	5U	5U

NA = Not Analyzed

ME/123/7026/2/TABLE5

Table 3, Continued.

	PGP18-11.0
Inorganics (mg/kg)	
Aluminum	*NA*
Antimony	*NA*
Arsenic	*NA*
Barium	*NA*
Beryllium	*NA*
Cadmium	*NA*
Calcium	*NA*
Chromium	*NA*
Cobalt	*NA*
Copper	*NA*
Cyanide (amenable)	*NA*
Cyanide (total)	*NA*
Iron	*NA*
Lead	*NA*
Magnesium	*NA*
Manganese	*NA*
Mercury	*NA*
Nickel	*NA*
Potassium	*NA*
Selenium	*NA*
Silver	*NA*
Sodium	*NA*
Thallium	*NA*
Vanadium	*NA*
Zinc	*NA*
Volatile Organics (ug/kg)	
Acetone	*97*
2-Butanone	*11U*
Carbon tetrachloride	*5U*
Chloroform	*5U*
1,1-Dichloroethane	*5U*
1,1-Dichloroethylene	*5U*
1,2-Dichloroethene (total)	*5U*
1,2-Dichloropropane	*5U*
Ethylbenzene	*5U*
Methylene Chloride	*20*
Tetrachloroethene	*5U*
Toluene	*2J*
1,1,1-Trichloroethane	*8*
Trichloroethene	*53*
Xylenes	*5U*

NA = Not Analyzed

ME/123/7026/2/TABLE5

WW ENGINEERING & SCIENCE

5010 Stone Mill Road · Bloomington, IN 47408 · Phone (812)336-0972 · FAX (812)336-3991

	Former Amphenol	**Boring No.**	PGP-17
	04-29-94	**Driller**	M. Chenoweth (GTI)
Logged by	JD Bryan	**Elevation**	720.8
Location	Hurricane Creek/Forsythe Street bridge	**Page**	1 of 1

Water Level					**Start**		**Finish**	
Time					**Time**	11:35AM	**Time**	12:20PM
Date					**Date**	04-29-94	**Date**	04-29-94

SAMPLE TYPE	DRIVEN	RECOVERED	BLOWS (6")	DEPTH (ft.)	GRAPHIC	DESCRIPTION
GP-1	2.0	1.6		0		Loam, dark brown (10 YR 3/3), slightly moist, friable, gradual contact at 1.3' with loam as above, yellowish brown (10 YR 5/6)
				1		
GP-2	2.0	1.0		2		Sandy loam, yellowish brown (10 YR 5/8), moist, friable, rare sand seam, rare cobble, gradual contact at 2.8' with loam, grayish brown (10 YR 5/2), slightly firm
				3		
GP-3	2.0	1.6		4		Loam, as above, wet sand seam at 4.90' - 4.92', clear contact at 5.2' with loam, granular, gray (10 YR 5/1), moist, firm
				5		
GP-4	2.0	1.3		6		Sand, medium to coarse, dark grayish brown (10 YR 4/2), wet, loose, abundant contact at 6.6' with loam, granular, dark gray (10 YR 4/1), very slightly moist, very firm
				7		
GP-5	2.0	1.8		8		Loam, granular, as above, dry
				9		
				10		T.D. 10.0'
				1		
				2		
				3		
				4		
				5		
				6		
				7		
				8		
				9		
				20		

Remarks

DATA QUALIFIER KEY

Shaded concentrations exceed the ARARs.

Inorganic Qualifiers:

U	Chemical not detected at specified detection limit
J	Estimated value
*	Duplicate analysis was not within control limits
B	Reported value is Below Contract Required Detection Limit (DL) but above Instrument DL
N	Spiked sample recovery not within control limits
W	Post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is <50% of spike absorbance
E	Value is estimated due to matrix interferences
M	Duplicate injection precision criteria not met
S	Reported value was determined by the Method of Standard Additions (MSA)

Organic Qualifiers:

U	Chemical not detected at specified detection limit
J	Estimated value
B	Analyte was found in associated blank as well as sample (for volatiles only)
E	Concentrations exceeds calibration range of GC/MS instrument
D	Chemical identified in an analysis at a secondary dilution factor

Table 4. RFI Surface Water Field Chemistry Data.

Sample	Date	pH (Std. Units)	T (deg C)	SpC25 (umhos/cm)	DOX (mg/l YSI)	DOX (mg/k HACH)	Q (cfs)
SW-01	02/25/92	*8.1*	*9.0*	*576*	*ND*	*ND*	*3.24*
SW-01	02/27/92	*8.3*	*14.0*	*555*	*ND*	*ND*	*ND*
SW-01	03/25/92	*ND*	*ND*	*ND*	*10.2*	*12*	*ND*
SW-02	02/25/92	*7.8*	*8.0*	*610*	*ND*	*ND*	*0.06*
SW-02Dup	02/25/92	*7.9*	*8.0*	*622*	*ND*	*ND*	*ND*
SW-02	02/27/92	*7.7*	*11.0*	*614*	*ND*	*ND*	*ND*
SW-02	03/25/92	*ND*	*ND*	*ND*	*11.4*	*13*	*ND*
SW-02	07/27/92	*8.6*	*.03*	*5718*	*ND*	*ND*	*0.35*
SW-02	02/17/93	*7.9*	*3.0*	*483*	*ND*	*ND*	*ND*
SW-03	02/25/92	*ND*	*ND*	*ND*	*ND*	*ND*	*3.76*
SW-03	02/27/92	*8.1*	*11.0*	*587*	*ND*	*ND*	*ND*
SW-03	03/25/92	*ND*	*ND*	*ND*	*11.9*	*11*	*ND*
SW-04	02/25/92	*ND*	*ND*	*ND*	*ND*	*ND*	*3.19*
SW-04	02/27/92	*8.3*	*11.0*	*587*	*ND*	*ND*	*ND*
SW-04	03/25/92	*ND*	*ND*	*ND*	*11.8*	*12*	*12*
SW-05	02/25/92	*7.7*	*7*	*617*	*ND*	*ND*	*ND*
SW-05	02/27/92	*7.9*	*13*	*597*	*ND*	*ND*	*0.111*
SW-05	03/25/92	*ND*	*ND*	*ND*	*13.2*	*14*	*ND*

ND=Not Determined
DOX=Dissolved Oxygen
YSI=Yellow Springs Instruments DOX Meter
HACH=HACH Systems DOX Tritation Kit
cfs=cubic feet/second

BL/mke/JDB/b:/Curtis/7026.00/Table6.wk1

Table 5. RFI Surface Water Analytical Data.

Sample Number	SW-01	SW-02	SW-02d	SW-05	SW-02	SW-02	SW-02D	EQUIP BLANK	TRIP BLANK
Date	02/26/92	02/26/92	02/26/92	02/26/92	07/27/92	02/18/93	02/08/93	02/18/93	02/26/92
organics (ug/l)									
luminum	*NA*	*NA*	*NA*	*NA*	*196NJB*	*NA*	*NA*	*NA*	*NA*
Antimony	*NA*	*NA*	*NA*	*NA*	*39.0UNJ*	*NA*	*NA*	*NA*	*NA*
Arsenic	*NA*	*NA*	*NA*	*NA*	*1.7B*	*NA*	*NA*	*NA*	*NA*
arium	*NA*	*NA*	*NA*	*NA*	*93.6B*	*NA*	*NA*	*NA*	*NA*
eryllium	*NA*	*NA*	*NA*	*NA*	*1.2BJ*	*NA*	*NA*	*NA*	*NA*
Cadmium	*NA*	*NA*	*NA*	*NA*	*3.0U*	*NA*	*NA*	*NA*	*NA*
alcium	*NA*	*NA*	*NA*	*NA*	*101000*	*NA*	*NA*	*NA*	*NA*
hromium	*NA*	*NA*	*NA*	*NA*	*6.0U*	*NA*	*NA*	*NA*	*NA*
Cobalt	*NA*	*NA*	*NA*	*NA*	*5.0U*	*NA*	*NA*	*NA*	*NA*
Copper	*NA*	*NA*	*NA*	*NA*	*9.0U*	*NA*	*NA*	*NA*	*NA*
yanide (amenable)	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<10*	*<10*	*<10*	*<10*	*NA*
Cyanide (total)	*10.00U*	*10.00U*	*10.00U*	*10.00U*	*10U*	*10U*	*10U*	*10U*	*NA*
Iron	*NA*	*NA*	*NA*	*NA*	*251*J*	*NA*	*NA*	*NA*	*NA*
ead	*NA*	*NA*	*NA*	*NA*	*1.0UJ*	*NA*	*NA*	*NA*	*NA*
agnesium	*NA*	*NA*	*NA*	*NA*	*27700*	*NA*	*NA*	*NA*	*NA*
Manganese	*NA*	*NA*	*NA*	*NA*	*25.1J*	*NA*	*NA*	*NA*	*NA*
ercury	*NA*	*NA*	*NA*	*NA*	*0.2U*	*NA*	*NA*	*NA*	*NA*
ickel	*NA*	*NA*	*NA*	*NA*	*7.0U*	*NA*	*NA*	*NA*	*NA*
Potassium	*NA*	*NA*	*NA*	*NA*	*3440B*	*NA*	*NA*	*NA*	*NA*
Selenium	*NA*	*NA*	*NA*	*NA*	*2.0UJ*	*NA*	*NA*	*NA*	*NA*
ilver	*NA*	*NA*	*NA*	*NA*	*8.0U*	*NA*	*NA*	*NA*	*NA*
Sodium	*NA*	*NA*	*NA*	*NA*	*6580J*	*NA*	*NA*	*NA*	*NA*
Thallium	*NA*	*NA*	*NA*	*NA*	*2.0UJ*	*NA*	*NA*	*NA*	*NA*
anadium	*NA*	*NA*	*NA*	*NA*	*5.0U*	*NA*	*NA*	*NA*	*NA*
inc	*NA*	*NA*	*NA*	*NA*	*81.4J*	*NA*	*NA*	*NA*	*NA*
Volatile Organics (ug/l)									
cetone	*10U*	*10U*	*10U*	*10U*	*11U*	*11U*	*11U*	*370*	*10U*
arbon Tetrachloride	*5U*	*5U*	*5U*	*5U*	*5U*	*10U*	*10U*		
1,1-Dichloroethane	*5U*	*5U*	*5U*	*5U*	*5U*	*3J*	*3J*	*20U*	*5U*
,2-Dichloropropane	*5U*	*5U*	*5U*	*5U*	*5U*	*10U*	*10U*	*24*	*5U*
etrachloroethene	*5U*	*5U*	*5U*	*5U*	*35*	*84*	*86*	*5J*	*5U*
Toluene	*1J*	*5U*	*5U*	*5U*	*5U*	*10U*	*10U*	*20U*	*5U*
1,1,1-Trichloroethane	*5U*	*5U*	*5U*	*5U*	*9*	*33*	*35*	*20U*	*5U*
richloroethene	*5U*	*5U*	*5U*	*5U*	*17*	*65*	*66*	*20U*	*5U*

NA = Not Analyzed

Table 6. RFI Surface Sediment Analytical Data.

Sample Number	SD-01	SD-02	SD-02	SD-03	SD-04	SD-05	EQUIP
			DUPLICATE				BLANK
Inorganics (mg/kg)							
Aluminum	3830*	8,780*	8080*	1,210*	1,910*	7900*	22.30B*
Antimony	9.1BN	11.7UN	12.20UN	7.70UN	8.50BN	8.90UN	6.60UN
Arsenic	3.6	3.6	3.10B	2.90	2.90	4.40	1.40U
Barium	37.2B	70.5B	64.80B	12.20B	15.00B	63.70	2.00U
Beryllium	1.2B	0.82B	0.74B	1.30	1.50	0.70B	0.20U
Calcium	97,600E	31,400E	29,000E	128,000E	180,000E	23,000E	100UE
Chromium	2.2B	12.9	11.60	1.20U	1.20U	12.2	1.0U
Cobalt	4.1B	6.2B	5.00B	3.10B	3.50B	5.80B	1.0U
Copper	11.4	32.9	23.70	6.70	9.20	29.20	1.4U
Cyanide (amenable)	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cyanide (total)	0.59U	0.89U	0.92U	0.59U	0.58U	0.67U	0.50U
Iron	7,170*	13,400*	11,800*	5,040*	5,000*	16,200*	54.40*
Lead	12.4	40.7	30.30	4.20S	5.90W	72.40W	0.44B
Magnesium	35,400	10,900	9,440	46,900	51,500	8,730	55.80U
Manganese	308*	400*	318*	306*	299*	368*	0.26B*
Mercury	0.12U	0.18U	0.51	0.12U	0.12U	0.13U	0.10U
Nickel	8.2B	14.7	12.60B	4.80B	5.50B	14.30	1.40U
Potassium	455B	1,020B	957B	220B	276B	802B	52.80U
Selenium	0.71UN	1.10UN	1.10UNW	0.70UN	0.70UN	0.81UN	0.60U
Thallium	0.48UW	0.71UW	0.74UW	0.47UW	0.47UW	0.54UW	0.40U
Vanadium	9.9B	20.7	18.20B	6.80B	6.70B	20.7	1.40U
Zinc	36*	194*	173*	20.4*	27.20*	119*	0.80B*
Volatile Organics (ug/kg)							
Acetone	12U	33B	28B	12U	12U	13U	10U
Methylene Chloride	35	42	28	6U	6U	36	5U
Tetrachloroethene	5J	9U	4J	6U	6U	5J	5U

NA = Not Analyzed

BL/mke/JDB/b:/Curtis/7026.00/2/TABLE8A.wk1

Table 7. RFI Ground Water Field Chemistry Data.

Sample	Date	pH (Std. Units)	T (deg C)	SpC 25 (umhos/cm)
MW-3	03/02/92	6.7	17.0	838
MW-9	03/03/92	7.2	17.5	852
MW-20	03/03/92	7	18.2	782
MW-12	03/02/92	6.9	19.0	802
	07/27/92	7.0	21.0	758
	02/16/93	7.2	4.0	751
MW-21	03/03/92	7.1	18.9	690
MW-21Dup	03/03/92	7.1	18.5	719
MW-22	03/02/92	7.1	18.5	856
	07/27/92	6.9	21.0	758
	02/16/93	7.2	3.0	621
MW-24	03/02/92	7.1	19.0	881
	02/16/93	7.2	3.0	759
MW-26	03/03/92	7.1	17.6	908
MW-27	02/17/93	7.3	0.0	880
MW-28	02/17/93	7.4	0.0	787
MW-29	02/17/93	7.5	0.0	919
MW-30	02/17/93	7.3	0.0	938
IT-2	03/04/92	7.1	16.0	869
	07/27/92	7.0	18.5	822
	02/16/93	7.2	6.0	785
IT-3	03/03/92	6.5	1.05	853
	07/27/92	7.0	2.00	74
	02/16/93	7.1	4.0	776
IT-3Dup	02/16/93	7.2	3.0	793
MW-23	03/03/92	7.5	17.0	531
MW-23Dup	03/03/92	7.6	17.0	555
MW-23	02/17/93	7.9	0.0	614
MW-23Dup	02/17/93	7.8	0.0	632
MW-25	03/10/92	7.3	11.0	614
	02/17/93	7.8	2.0	580
IT-1A	03/03/92	7.3	18.1	495
	02/17/93	8.0	0.0	612

Table 7, Continued.

Sample (depth)	Date	pH (Std. Units)	T (deg C)	SpC 25 (umhos/cm)
PGP-1	02/16/93	*7.4*	*4.0*	*684*
PGP-2	02/16/93	*7.4*	*9.0*	*662*
PGP-3	02/18/93	*6.9*	*10.5*	*600*
PGP-4S	02/17/93	*7.5*	*0.0*	*938*
PGP-4D	02/17/93	*7.7*	*0.0*	*882*
PGP-6 (18-20)	02/25/93	*7.2*	*7.0*	*930*
PGP-6 (25-27)	02/25/93	*7.3*	*6.01*	*1020*
PGP-7 (13-15)	02/25/93	*7.2*	*5.0*	*1052*
PGP-7 (19-21)d	02/25/93	*7.3*	*3.0*	*845*
PGP-7 (19-21)	02/25/93	*7.3*	*6.0*	*801*
PGP-7 (24.5-26.5)	02/25/93	*7.4*	*6.0*	*816*
PGP-8	02/26/93	*7.4*	*8.0*	*740*
PGP-9	02/26/93	*7.4*	*8.0*	*800*
PGP-10	03/02/93	*6.7*	*9.0*	*720*

BL/mke/JDB/b:/Curtis/7026.00/1/Table9.wk1

Table 8. Ground Water Analytical Data.

Sample Number	MW-9	MW-20	MW-26	IT-2	IT-2	IT-2	IT-3	IT-3	IT-3
Date Sampled	03/03/92	03/03/92	03/03/92	03/03/92	07/27/92	02/16/93	03/03/92	07/27/92	02/16/93
Inorganics (mg/l)									
Aluminum	8.610	5.71	5.02	6.020	14.2NJ	0.991NJ	11	15.3NJ	3.2NJ
Antimony	0.017UN	0.017UN	0.017U	0.017U	0.039UN	0.016UN	0.017UN	0.039UN	0.016UN
Arsenic	0.006UN	0.006UN	0.006U	0.006UN	0.0062B	0.0024BNJ	0.006UNWM	0.0116	0.0039BJ
Barium	0.27	0.38	0.223	0.694	0.815	0.258	0.423	0.409	0.201
Beryllium	0.0014B	0.0011B	0.001U	0.0011B	0.0051J	0.001U	0.0018B	0.0065J	0.001U
Cadmium	0.002U	0.002U	0.002U	0.002U	0.003U	0.003U	0.002U	0.003U	0.003U
Calcium	525	612	345	394	523	123	567	480	226
Chromium	0.027	0.0201	0.0232	0.0169	0.0244	0.006BJ	0.0328	0.0339	0.0132J
Cobalt	0.0156B	0.0125B	0.011B	0.0153B	0.0207B	0.006UJ	0.0344B	0.0426B	0.0062BJ
Copper	0.0727	0.0674	0.0474	0.0767	0.0871	0.0075BJ	0.0949	0.0724	0.0234BJ
Cyanide (amenable)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cyanide (total)	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U
Iron	15.7	13.2	16.9	21.2	37.3J*	2.59J	28.4	43.9J*	8.23J
Lead	0.0565*	0.0406*	0.0324S*	0.0417S*	0.0511NJS	0.0025BNJ	0.079*	0.0504JNW	0.0119JN
Magnesium	158	232	114	123	180	41	187	151	67
Manganese	1.03	2.84	1.02	1.73	2.25J	0.382J	2.8	3.86J	0.939J
Mercury	0.00038	0.00034	0.00023	0.0002	0.0002U	0.0002U	0.0003	0.00053	0.0002U
Nickel	0.0476	0.0409	0.0434	0.0501	0.135	0.0194BJ	0.0646	0.0813	0.0248BJB
Potassium	3.84B	4.59B	7.01	3.610B	4.8B	1.68B	3.51B	4.13B	2.37B
Selenium	0.043B	0.003U	0.003UW	0.003U	0.002UJWN	0.001U	0.0053	0.002UJN	0.0016BUNW
Silver	0.002U	0.002U	0.002U	0.002U	0.008U	0.002U	0.002U	0.008U	0.002U
Sodium	9.53	10.3	10	20.9	19.8J	18.8J	7.39	7.28J	7.49J
Thallium	0.002UN	0.002UN	0.002UN	0.002U	0.002U	0.003U	0.002UN	0.002U	0.003U
Vanadium	0.0421B	0.0354B	0.0227B	0.023B	0.0372B	0.006U	0.0369B	0.0379B	0.0104BJ
Zinc	0.198E	1.08E	0.0899E	0.110E	0.197J	0.153BJE	0.177E	0.171J	0.0494
Volatile Organics (ug/l)									
Acetone	7J	10U	10U	11	12U	10U	5U	12U	10U
Carbon Tetrachloride	5U	5U	5U	5U	5U	10U	5U	5U	10U
1,1-Dichloroethane	5U	5U	5U	41	17	18	4J	4J	5J
1,1-Dichloroethylene	5U	5U	5U	5U	5U	10U	5U	5U	11
1,2-Dichloroethene (total)	5U	5U	5U	78	30	51	5U	5U	10U
1,2-Dichloropropane	5U	5U	5U	5U	5U	10U	5U	5U	10U
Ethylbenzene	5U	5U	5U	5U	5U	10U	5U	5U	10U
Methylene Chloride	5U	5U	5U	5U	1J	10U	5U	5U	10U
Tetrachloroethene	5U	5U	3J	5U	10U	5J	5U	8	10U
Toluene	5U	5U	5U	5U	5U	10U	5U	5U	10U
1,1,1-Trichloroethane	9	5U	5	25	28	29	83	67	71
Trichloroethene	2J	5U	5U	18	39	29	34	22	29
Xylenes	5U	5U	5U	5U	5U	10U	5U	5U	10U

NA = Not Analyzed

Table 8, Continued.

Sample Number Date Sampled	IT-3	MW-3	MW-12	MW-12	MW-12	MW-12	MW-12	MW-21
	02/16/93	03/02/92	03/02/92	03/02/92	07/27/92	02/16/93	02/16/93	03/03/92
	Duplicate		Dissolved	Total		Dissolved		
Inorganics (mg/l)								
Aluminum	5.48NJ	4.85	NA	NA	8.35NJ	0.129BNJ	3.51NJ	8.5
Antimony	0.016UN	0.017U	<0.06	<0.06	39.0UN	0.016UN	0.016UN	0.017UN
Arsenic	0.0078NJ	0.0033B	<0.010	<0.010	7.0B	0.002UNJ	0.0031BNJ	0.006UN
Barium	0.218	0.269	0.101	0.559	296	0.796B	0.159B	0.472
Beryllium	0.001U	0.001U	<0.005	<0.005	5.1J	0.001U	0.001U	0.0025B
Cadmium	0.003U	0.002U	<0.005	<0.005	3.0U	0.003U	0.003U	0.0025B
Calcium	263	340	NA	NA	401	90.2	193	1,000
Chromium	0.0181J	0.0156	<0.005	0.0247	12.7	0.006UJ	0.0116J	0.0585
Cobalt	0.0151BJ	0.0088	<0.010	0.0804	20.8B	0.006UJ	0.0063BJ	0.075
Copper	0.0321	0.0906	<0.010	0.160	53.3	0.0022BJ	0.0238BJ	0.51
Cyanide (amenable)	<0.010	<0.010	<0.010	<0.010	<0.010	NA	<0.010	<0.010
Cyanide (total)	0.010U	0.010U	NA	NA	0.010U	NA	0.010U	0.010U
Iron	15.1J	8.79	NA	NA	34.2*J	0.0343BU	12.9J	7.67
Lead	0.0199NJ	0.0295S	0.00908	0.8234	0.0583WNJ	0.002UNJ	0.0223NJ	0.152*
Magnesium	90.8	65.7	NA	NA	114	· 27	45	342
Manganese	1.72	0.982	NA	NA	2.12J	0.131J	0.782J	3.52
Mercury	0.002UN	0.00026	<0.0002	0.00049	0.00026	0.0002UN	0.0002UN	0.00035
Nickel	0.0357BJ	0.0588	<0.010	0.118	0.052	0.015UJ	0.0394BJ	0.538
Potassium	2.51BU	3.54B	NA	NA	3.74B	1.59BU	2.490BU	3.57B
Selenium	0.0015BWNU	0.0034B	<0.005	0.0075	0.0029BWNJ	0.001UN	0.0021BWNU	0.0075
Silver	0.002U	0.0121	<0.010	<0.010	0.008U	0.002U	0.002U	0.0467
Sodium	7.49J	8.79	NA	NA	9.13J	8.35J	8.25J	6.53
Thallium	0.003U	0.002U	<0.010	<0.010	0.002UWN	0.003UW	0.003UW	0.002UN
Vanadium	0.0174BJ	0.020B	<0.010	0.0289	0.0267B	0.006U	0.0096BJ	0.0638
Zinc	0.0769EJ	0.0944E	0.0119	0.345	0.165J	0.0034BEU	0.0696EJ	0.256E
Volatile Organics (ug/l)								
Acetone	10U	10U	NA	<500	500U	NA	1000U	10U
Carbon Tetrachloride	10U	5U	NA	<250	250U	NA	1000U	5U
1,1-Dichloroethane	5J	5U	NA	103J	190J	NA	136J	5U
1,1-Dichloroethylene	11	5U	NA	<250	250U	NA	1000U	5U
1,2-Dichloroethene (total)	10U	5U	NA	NA	250U	NA	1000U	5U
1,2-Dichloropropane	10U	5U	NA	<250	250U	NA	1000U	5U
Ethylbenzene	10U	5U	NA	<250	250U	NA	1000U	5U
Methylene Chloride	10U	5U	NA	<250	250U	NA	1000U	5U
Tetrachloroethene	10U	150	NA	3471	5900	NA	5695	59
Toluene	10U	5U	NA	<250	250U	NA	1000U	5U
1,1,1-Trichloroethane	73	4J	NA	2041	5400	NA	2221	5U
Trichloroethene	23	81	NA	2641	4700	NA	4759	15
Xylenes	10U	5U	NA	<250	250U	NA	1000U	5

NA = Not Analyzed

Table 8, Continued.

Sample Number **Date Sampled**	MW-21	MW-22	MW-22	MW-22	MW-22	MW-22	MW-24	MW-24	MW-27
	03/03/92	03/02/92	03/02/92	07/27/92	02/16/93	02/16/93	03/02/92	02/16/93	02/17/93
	Duplicate	Dissolved	Total		Dissolved				
Inorganics (mg/l)									
Aluminum	0.101B	NA	NA	7.59NJ	0.0744BNJ	5.18NJ	15.6	10.6NJ	13.5J
Antimony	0.017UN	<0.06	<0.06	0.039UN	0.016UN	0.016UNJ	0.017U	0.016UN	0.035UN
Arsenic	0.006UN	<0.010	<0.010	0.0025B	0.002UNJ	0.002UN	0.0044B	0.0038BNJ	0.0068SNJ
Barium	0.528	0.0824	0.307	0.216	0.0655B	0.165B	0.505	0.266	0.509
Beryllium	0.001U	<0.005	<0.005	0.005BJ	0.001U	0.001U	0.0023B	0.001U	0.0019B
Cadmium	0.002U	<0.005	<0.005	0.003U	0.003U	0.003U	0.002U	0.003U	0.002UB
Calcium	1170	NA	NA	387	82.2	275	774	390	998
Chromium	0.0873	<0.005	0.0365	0.0182	0.006UJ	0.0178J	0.0371	0.0303J	0.0354J
Cobalt	0.011B	<0.010	0.0343	0.0187B	0.006UJ	0.0138J	0.0231B	0.0225BJ	0.0226BJ
Copper	0.0181B	<0.010	0.234	0.0945	0.002U	0.0962J	0.142	0.0789J	0.233
Cyanide (amenable)	<0.010	<0.010	NA	<0.010	NA	<0.010	<0.010	<0.010	<0.010
Cyanide (total)	0.010U	NA	NA	0.010U	NA	0.010U	0.010U	0.010U	0.010U
Iron	0.407	NA	NA	17.9J	0.0265BU	12.8J	18.1	20.1J	26
Lead	0.0046*	<0.003	0.05842	0.035WNJ	0.002UNJ	0.0292NJ	0.0594W	0.07545WSJ	0.112
Magnesium	323	NA	NA	128	25.4	97.6	178	125	172
Manganese	2.440	NA	NA	2.1J	0.387J	1.58J	2.17	2.01J	2.27J
Mercury	0.00045	<0.0002	0.00026	0.00039	0.0002UN	0.0002UN	0.00067	0.0002UN	0.0002UN
Nickel	0.122	<0.010	0.0929	0.0606	0.015UJ	0.0453J	0.0652	0.0586J	0.123J
Potassium	3.52B	NA	NA	3.66B	1.59BU	2.53BU	5.53	3.050BU	3.8BJ
Selenium	0.259SM	<0.005	<0.005	0.002UWN	0.0019BWNU	0.002BWNU	0.0049BS	0.0022BWNU	0.0068B
Silver	0.002U	<0.010	0.0622	0.0233	0.002U	0.0147	0.002U	0.002U	0.0084B
Sodium	7.53	NA	NA	8.82J	5.47J	5.48J	5.84	6.16J	5.81E
Thallium	0.002UN	<0.01	<0.010	0.002UWN	0.003U	0.003UW	0.002U	0.003U	0.002UW
Vanadium	0.089	<0.010	0.0705	0.0282B	0.006U	0.026BJ	0.0538	0.0346BJ	0.0369BJ
Zinc	0.0053BE	<0.010	0.236	0.109J	0.0032BEU	0.106EJ	0.224E	0.164EJ	0.296J
Volatile Organics (ug/l)									
Acetone	10U	NA	<1,000	2000U	NA	1000U	10U	5J	120U
Carbon Tetrachloride	5U	NA	<500	1000U	NA	1000U	5U	10U	50U
1,1-Dichloroethane	5U	NA	<500	1000U	NA	1000U	5U	10U	50U
1,1-Dichloroethylene	5U	NA	<500	1000U	NA	1000U	5U	10U	50U
1,2-Dichloroethene (total)	5U	NA	NA	1000U	NA	1000U	5U	10U	50U
1,2-Dichloropropane	5U	NA	<500	1000U	NA	1000U	5U	10U	50U
Ethylbenzene	5U	NA	<500	1000U	NA	1000U	5U	10U	50U
Methylene Chloride	5U	NA	<500	1000U	NA	1000U	2J	10U	50U
Tetrachloroethene	56	NA	15,774	21000	NA	19499	8	10U	567
Toluene	5	NA	<500	1000U	NA	1000U	1J	10U	50U
1,1,1-Trichloroethane	0.8J	NA	<500	1000U	NA	1000U	44	53	24J
Trichloroethene	14	NA	3,167	2500	NA	1955J	40	189	50U
Xylenes	5U	NA	<500	1000U	NA	1000U	5U	10U	50U

NA = Not Analyzed

Table 8, Continued.

Sample Number Date Sampled	MW-28 02/17/93	MW-29 02/17/93	MW-30 02/17/93	IT-1A 03/03/92	IT-1A 02/17/93	MW-23 03/03/92	MW-23Dup 03/03/92	MW-23 02/17/93	MW-23Dup 02/17/93
Inorganics (mg/l)									
Aluminum	3.99J	11.2J	8.31J	0.484	0.321J	15.8	14.7	12.7J	7.14J
Antimony	0.035UN	0.035UN	0.035UN	0.017UN	0.035UN	0.017UN	0.017UN	0.035UN	0.035UN
Arsenic	0.00356NJ	0.00628NJ	0.0162JN	0.077N	0.0408JSN	0.0070BN	0.0074BN	0.0135NJ	0.01695NSJ
Barium	0.127B	0.701	0.569	0.144B	0.120B	0.5	0.473	0.442	0.456
Beryllium	0.001U	0.0018	0.001U	0.001U	0.001U	0.0021B	0.0019B	0.001U	0.001U
Cadmium	0.002U	0.002U	0.002U	0.002U	0.0054	0.002U	0.002U	0.002U	0.002U
Calcium	202	1100	936	63	66.3	193	169	153	164
Chromium	0.0197J	0.0229J	0.0221J	0.004U	0.0083JB	0.0284	0.0256	0.0133J	0.0072JB
Cobalt	0.0148BJ	0.0418J	0.0229BJ	0.004U	0.005UJ	0.0135B	0.0118B	0.0105BJ	0.0084BJB
Copper	0.0803	0.0827	0.0629	0.006U	0.0148UB	0.13	0.121	0.0821	0.0677
Cyanide (amenable)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cyanide (total)	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U
Iron	12.7J	30.5J	24.3J	2.92	7.01J	26	23.1	22.4J	21.8J
Lead	0.0416	0.109	0.0374	0.0027B*	0.0063U	0.0693*	0.0957*	0.0353	0.0294W
Magnesium	67.4	181	98.7	30.8	30.4	73.3	63.2	58.9	65.8
Manganese	0.803J	4.0J	4.46J	0.292	0.333J	3.25	2.9	3.34J	3.15J
Mercury	0.0002UN	0.00057NJ	0.0002UN	0.0002U	0.00033N	0.0002U	0.0002U	0.00054NJ	0.0002U
Nickel	0.040J	0.0958J	0.0774J	0.0113B	0.018UJ	0.0417	0.0346B	0.0402J	0.0261JB
Potassium	2.36BJ	5.47J	4.13BJ	1.83B	2.13BJ	2.87B	2.88B	2.76BJ	2.4BJB
Selenium	0.001UW	0.005U	0.005U	0.003U	0.001U	0.003U	0.003U	0.001UW	0.001UW
Silver	0.003U	0.003U	0.003U	0.002U	0.003U	0.002U	0.002U	0.003U	0.003U
Sodium	5.44E	7.84E	6.5E	34.8	29.3E	31.2	30.9	29.3E	28.4E
Thallium	0.002U	0.002UW	0.002UW	0.002UN	0.002U	0.002UN	0.002UN	0.002U	0.002U
Vanadium	0.0231BJ	0.036BJ	0.0238BJ	0.004U	0.004UJ	0.037B	0.0357B	0.0255BJ	0.0207BJU
Zinc	0.0862J	0.458J	0.151J	0.0092BE	0.0239J	0.261E	0.234E	0.107J	.0863J
Volatile Organics (ug/l)									
Acetone	50U	18U	27U	8J	10U	10U	10U	10U	10U
Carbon Tetrachloride	12	10U	20U	5U	10U	5U	5U	10U	10U
1,1-Dichloroethane	50U	2J	59	5U	10U	5U	5U	10U	10U
1,1-Dichloroethylene	8J	10U	5J	5U	10U	5U	5U	10U	10U
1,2-Dichloroethene (total)	50U	10U	20U	5U	10U	5U	5U	10U	10U
1,2-Dichloropropane	50U	10U	20U	5U	10U	5U	5U	10U	10U
Ethylbenzene	50U	10U	20U	5U	10U	5U	5U	10U	10U
Methylene Chloride	50U	10U	20U	5U	10U	5U	5U	10U	10U
Tetrachloroethene	318	96	20U	9	10U	47	40	31U	38U
Toluene	50U	10U	20U	5U	10U	5U	5U	10U	10U
1,1,1-Trichloroethane	415	16	311	5U	10U	5U	5U	2J	2J
Trichloroethene	230	14	295	5U	10U	7	5	13J	21J
Xylenes	50U	10U	20U	5U	10U	5U	5U	10U	10U

NA = Not Analyzed

Table 8, Continued.

Sample Number	**MW-25**	**MW-25**	**PGP-1**	**PGP-2**	**PGP-3**	**PGP-3**	**PGP-4S**	**PGP-4D**	**PGP-6**
Date Sampled	03/10/92	02/17/93	02/16/93	02/16/93	02/18/93	02/18/93	02/17/93	02/17/93	02/24/93
						Duplicate			13.0-15.0
Inorganics (mg/l)									
Aluminum	0.7	6.73	0.649NJ	2.91NJ	0.432U	0.188B	0.946J	0.814J	3.54*J
Antimony	0.016U	0.035UN	0.016UN	0.016UN	0.035UN	0.035UN	0.035UN	0.035UN	0.024UN
Arsenic	0.006U	0.0042BN	0.002UNJ	0.0046BNJ	0.002UNJ	0.002UN	0.0025BNJ	0.0047BNJ	0.0038BWNJ
Barium	0.00642B	0.162B	0.0499B	0.147B	0.096B	0.0942B	0.0942B	0.117B	0.176B
Beryllium	0.001U	0.001U	0.001U	0.001U	0.001U	0.001U	0.001U	0.001U	0.001U
Cadmium	0.002U	0.002U	0.003U	0.003U	0.002U	0.002U	0.002U	0.002U	0.002B
Calcium	60	181	148	303	142	128	153	232	546
Chromium	0.003U	.0163	0.006UJ	0.020J	0.004U	0.004U	0.004U	0.0054BJ	0.0186UJ
Cobalt	0.006U	0.012B	0.006UJ	0.0073BJ	0.005UJ	0.005U	0.0062BJ	0.0055BJ	0.0218B
Copper	0.004U	0.0412	0.009BJ	0.037J	0.0078BU	0.003U	0.0164B	0.0107BU	0.0284J
Cyanide (amenable)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cyanide (total)	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010UN
Iron	1.22	13	1.17J	11.9J	1.45J	0.633	4.33J	4.56J	12.1*J
Lead	0.0043W	0.249	0.0032NJ	0.0183NJ	0.0012BU	0.001U	0.0061	0.0045U	0.0196
Magnesium	26.6	62.8	46.8	81.6	44.2	38.8	44.1	40.7	135
Manganese	0.357	2.07	0.130J	0.802J	0.124J	0.0549	0.394J	0.806J	1.86
Mercury	0.0002U	0.0002U	0.0002UN	0.0002UN	0.0002UN	0.0002UN	0.00033N	0.0002UN	0.0002U
Nickel	0.008U	0.0401	0.0822J	0.693J	0.018UJ	0.018U	0.0653J	0.400J	0.306J
Potassium	2.25B	2.64B	0.892BU	2.82BU	3.22BJ	2.77B	3.09BJ	3.82BJ	5.94J
Selenium	0.002U	0.001U	0.001BNU	0.001UWN	0.001U	0.001U	0.001U	0.001UW	0.0012BWNUJ
Silver	0.001U	0.003U	0.002U	0.002U	0.003U	0.003U	0.003U	0.003U	0.003U
Sodium	25.7	28	15.1J	17.9J	6.26E	5.99E	8.0E	9.29E	16.1
Thallium	0.002U	0.002U	0.003UW	0.003UW	0.002UW	0.002UW	0.002UW	0.002UW	0.002UWN
Vanadium	0.006U	0.0164B	0.006U	0.0144BJ	0.004UJ	0.004U	0.004UJ	0.004UJ	0.0174BUJ
Zinc	0.0172B	0.103	0.0565EJ	0.614EJ	0.0566J	0.0234	0.173J	0.289J	0.469J*
Volatile Organics (ug/l)									
Acetone	10U	10U	7J	9J	10U	10U	500U	1051U	15U
Carbon Tetrachloride	5U	10U	10U	10U	10U	10U	500U	1000U	10U
1,1-Dichloroethane	5U	10U	10U	10U	2J	1J	138J	817J	10U
1,1-Dichloroethylene	5U	10U	10U	10U	10U	10U	500U	1000U	10U
1,2-Dichloroethene (total)	5U	10U	10U	10U	2J	2J	500U	1000U	10U
1,2-Dichloropropane	5U	10U	10U	10U	10U	10U	500U	1000U	10U
Ethylbenzene	5U	10U	10U	10U	10U	10U	500U	1000U	10U
Methylene Chloride	5U	10U	10U	10U	10U	10U	500U	1000U	10U
Tetrachloroethene	2J	19	10U	10U	10U	10U	3004	6748	10U
Toluene	5U	10U	10U	10U	10U	10U	500U	1000U	3J
1,1,1-Trichloroethane	5U	10U	10U	10U	1J	1J	1722	1159	10U
Trichloroethene	5U	11	10U	10U	10U	10U	5857	4244	10U
Xylenes	5U	10U	10U	10U	10U	10U	500U	1000U	1J

NA = Not Analyzed

Table 8, Continued.

Sample Number	PGP-6	PGP-6	PGP-7	PGP-7	PGP-7Dup	PGP-7	PGP-8	PGP-9	PGP-10
Date Sampled	02/24/93	02/24/93	02/24/93	02/24/93	02/24/93	02/24/93	02/26/93	02/24/93	03/02/903
	18.0-20.0	25-27	13-15	19-21	19-21	24.5-26.5			
Inorganics (mg/l)									
Aluminum	3.17*J	3.5*J	3.64*J	2.02*J	1.78*J	0.48*UJ	2.46*J	2.13J	4.25*J
Antimony	0.024UN	0.024UN	0.024UN	0.024UN	0.024UN	0.024UN	0.024UN	0.024UN	0.024UN
Arsenic	0.0035BWNJ	0.0037BNJ	0.0036BNJ	0.004BWNJ	0.0028BNJ	0.002UNJ	0.002UNJ	0.0021BNJ	0.002UNJ
Barium	0.124B	0.174B	0.142B	0.131B	0.128B	0.110B	0.147B	0.118B	0.111B
Beryllium	0.001U	0.001U	0.001U	0.001U	0.001U	0.001U	0.001U	0.001U	0.001U
Cadmium	0.002U	0.0023B	0.002U	0.002U	0.002U	0.002U	0.002U	0.002U	0.002U
Calcium	380	292	381	232	230	159	287	269	271
Chromium	0.0114UJ	0.0283J	0.0462J	0.0133UJ	0.0076BUJ	0.0057BUJ	0.013J	0.0128JU	0.0099BUJ
Cobalt	0.0106B	0.0127B	0.0288B	0.0212B	0.0183B	0.005U	0.0085B	0.005U	0.0074B
Copper	0.0219B	0.0309J	0.0326J	0.0189BU	0.0174BU	0.0073BU	0.020BU	0.0148BU	0.027J
Cyanide (amenable)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cyanide (total)	0.010UN	0.010UN	0.010UN	0.010UN	0.010UN	0.010UN	0.010UN	0.010UN	0.010UN
Iron	11.9*J	10.1*J	19.4*J	12*J	9.96*J	2.36*UJ	9.68*J	7.35J	9.76*J
Lead	0.0198	0.0273S	0.0336	0.0329	0.0244	0.0037	0.0133S	0.0122S	0.0327
Magnesium	134	96.2	129	80.7	73.6	49.2	89.6	89	107
Manganese	0.825	0.871	1.36	1.04	0.933	0.228	1.53	0.497	0.96
Mercury	0.0002U	0.0002U	0.0002U	0.0002U	0.0002U	0.0002U	0.0002U	0.0002U	0.0002U
Nickel	0.0935J	0.153J	0.150J	0.0392JB	0.03BJ	0.027UJ	0.0548J	0.027UJ	0.027UJ
Potassium	3.4JB	7.81J	3.46BJ	2.34JB	2.13JB	3.66BJ	3.35BJ	1.97BJ	1.74BJ
Selenium	0.001UWNJ	0.0015BNJ	0.001UWN	0.0016BUJ	0.001UNJ	0.001UNJ	0.0013BNUJ	.0029BWNUJ	0.001UWNJ
Silver	0.003U	0.003U	0.003U	0.003U	0.003UB	0.003U	0.003U	0.003U	0.003U
Sodium	11.2J	9.92J	6.45J	8.79J	8.97J	10.6J	8.33J	12.4J	15.7J
Thallium	0.002UWN	0.002UWN	0.002UWN	0.002UWN	0.002UWN	0.002UN	0.002UN	0.002UN	0.002UN
Vanadium	0.0187BUJ	0.0212BJ	0.0182BUJ	0.0163BJ	0.0122BUJ	0.004UJ	0.0124BUJ	0.0105BUJ	0.0161BUJ
Zinc	0.166*J	0.305*J	0.224*J	0.0835*UJ	0.067*J	0.0351*UJ	0.178*J	0.064*UJ	0.0712*UJ
Volatile Organics (ug/l)									
Acetone	12U	10U	16U	13U	13U	10U	10U	10U	10U
Carbon Tetrachloride	10U	10U	10U	10U	10U	10U	10U	10U	10U
1,1-Dichloroethane	10U	2J	10U	10U	10U	10U	10U	18	10U
1,1-Dichloroethylene	10U	10U	10U	10U	10U	10U	10U	6J	10U
1,2-Dichloroethene (total)	2J	42	10U	10U	10U	10U	10U	10U	10U
1,2-Dichloropropane	10U	10U	10U	10U	10U	10U	10U	10U	10U
Ethylbenzene	10U	10U	10U	10U	10U	10U	10U	10U	10U
Methylene Chloride	10U	10U	10U	10U	10U	10U	10U	2J	10U
Tetrachloroethene	10U	10U	10U	10U	10U	10U	51	10U	10U
Toluene	4J	10U	10U	10U	10U	10U	10U	10U	10U
1,1,1-Trichloroethane	2J	11	2J	14	14	10U	82	340E	15
Trichloroethene	10U	5J	1J	14	14	10U	120J	190DE	10U
Xylenes	2J	10U	10U	10U	10U	10U	10U	10U	10U

NA = Not Analyzed

Table 8, Continued.

Sample Number Date Sampled	PGP-10 03/02/93 Duplicate	PGP-12 05/21/93	PGP-13 05/21/93	PGP-13 05/21/93 Duplicate	PGP-14 05/21/93	PGP-15 04/29/94	PGP-16 04/29/94	PGP-16 04/29/94 Duplicate	PGP-18 04/29/94
Inorganics (mg/l)									
Aluminum	4.1*J	2.58J	0.330U	0.585	2.75J	23.6	2.56J	0.490UJ	12.7
Antimony	0.024UN	0.023U	0.023U	0.023U	0.023U	0.053U	0.053U	0.053U	0.053U
Arsenic	0.002UNJ	0.0061B	0.002U	0.002U	0.0036B	0.0054B	0.0041B	0.002U	0.0065B
Barium	0.0997B	0.918	0.0792B	0.0679B	0.125B	0.430	0.120J	0.0787	0.187B
Beryllium	0.001U	0.001U	0.001U	0.001U	0.001U	0.0017B	0.001U	0.001U	0.001B
Cadmium	0.002U	0.003U	0.003U	0.003U	0.003U	0.004U	0.004U	0.004U	0.004U
Calcium	271	493	197	149	213	871	239J	139J	446
Chromium	0.0107UJ	0.0237U	0.0072U	0.0067U	0.0285U	0.110	0.0082B	0.006U	0.0472
Cobalt	0.005U	0.0076B	0.0095B	0.006U	0.006U	0.08	0.009U	0.009U	0.042B
Copper	0.0278J	0.0312	0.0097B	0.0104B	0.0351	0.114	0.023UJ	0.0136UJ	0.137
Cyanide (amenable)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cyanide (total)	0.010UN	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U
Iron	10.1*J	15.8	2.85U	2.35U	4.71	83.6	10.4J	2.0J	61.8
Lead	0.0523	0.0198	0.0027U	0.0035U	0.0169	0.0615	0.0071UJ	0.0025UJ	0.044
Magnesium	97.8	64.9	26.1	44.4	71.4	312	75.5	39.3J	157
Manganese	0.916	1.74	0.754	0.180U	1.35	5.71	0.862J	0.150J	3.33
Mercury	0.0002U	0.0002U	0.0002U	0.0002U	0.0002U	0.00026	0.0002U	0.0002U	0.00022
Nickel	0.0308BJ	0.0314B	0.0209B	0.007U	0.0375B	0.162	0.0146B	0.012U	0.124
Potassium	2.08BJ	6.02	1.54B	2.06B	1.82B	5.73	2.83B	2.35B	3.58B
Selenium	0.001UNJ	0.002U	0.002U	0.002U	0.002U	0.002U	0.0028B	0.0034B	0.002U
Silver	0.003U	0.007U	0.007U	0.007U	0.007U	0.006U	0.006U	0.006U	0.006U
Sodium	15.8	15.2	16.8U	27.9	17.8U	30.7	23.5J	23.5J	11.8
Thallium	0.002UN	0.002U	0.002U	0.002U	0.002U	0.002U	0.002U	0.002U	0.0025B
Vanadium	0.0144BUJ	0.0084B	0.005U	0.005U	0.0068B	0.0596	0.0114B	0.008U	0.0412B
Zinc	0.0767*UJ	0.160U	0.377	0.063U	0.181U	0.891	0.0397UJ	0.0145UJ	0.359
Volatile Organics (ug/l)									
Acetone	9J	10U	7J	10U	10U	10U	25U	25U	10U
Carbon Tetrachloride	10U	10U	10U	10U	10U	5U	12U	12U	5U
1,1-Dichloroethane	10U	10U	10U	10U	10U	5U	12U	12U	5U
1,1-Dichloroethylene	10U	10U	10U	10U	10U	5U	12U	12U	5U
1,2-Dichloroethene (total)	10U	10U	10U	10U	10U	5U	12U	12U	5U
1,2-Dichloropropane	10U	10U	10U	10U	10U	5U	12U	12U	5U
Ethylbenzene	10U	10U	10U	10U	10U	5U	12U	12U	5U
Methylene Chloride	10U	10U	10U	10U	10U	6U	22UJ	32UJ	12U
Tetrachloroethene	10U	10U	10U	10U	10U	79	12U	12U	5U
Toluene	10U	10U	10U	10U	10U	5U	12U	12U	5U
1,1,1-Trichloroethane	13	10U	10	11	10U	37	100	98	51
Trichloroethene	10U	10U	22	25	10U	75	400J	380	170
Xylenes	10U	10U	10U	10U	10U	5U	12U	12U	5U

NA = Not Analyzed

Table 9. Summary of Redevelopment Activities, Unit D Monitoring Wells.

Well No.	Date	Elapsed Time (min.)	Flow Rate (GPM)	Volume (gal.)	Total Volume
MW-23	29 July 92	31	3.3	102	
		60	4.0	240	342
	07 Jan. 93	70	2.0	140	140
	16 Feb. 93	90	3.0	270	270
					752
MW-25	29 July 92	32	1.5	48	
		16	1.7	27	
		71	2.0	142	217
	07 Jan. 93	25	2.5	63	
		115	2.0	230	293
	16 Feb. 93	145	2.5	363	363
					873
IT-1A	29 July 92	36	0.7	25	
		52	0.8	42	67
	07 Jan. 93	70	0.8	56	56
	16 Feb. 93	180	0.8	144	144
					267

GPM=Gallons per Minute

JDB/Table11A.wk1

Table 10. RFI Ground Water VOC Screening Analytical Results

	SGP-9	SGP-10	SGP-11	SGP-12	SPG-13	SGP-14
1,1-Dichloroethane	<1.0	<1.0	<1.0	4.7	8.0	<1.0
1,1,1-Trichloroethane	32.8	<1.0	44.2	57.2	99.3	3.7
Tetrachloroethene	53.7	<1.0	8.0	<1.0	<1.0	10.9
Trichloroethene	63.8	<1.0	133.9	319.2	397.7	13.6

	SGP-15	SGP-16	SGP-17	SGP-18	SGP-19	SGP-20
1,1-Dichloroethane	<1.0	18.0	14.3	<1.0	<1.0	<1.0
1,1,1-Trichloroethane	25.8	195.6	103.4	21.2	<1.0	30.4
Tetrachloroethene	136.5	<1.0	5.5	<1.0	<1.0	<1.0
Trichloroethene	53.1	812.3	544.7	107.2	<1.0	271.4

	SGP-21	SGP-22	SGP-23	SGP-24	SGP-25	SGP-26
1,1-Dichloroethane	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,1-Trichloroethane	45.4	<1.0	<1.0	17.8	<1.0	35.1
Tetrachloroethene	20.4	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	43.5	<1.0	<1.0	113.7	<1.0	161.9

	SGP-27	SGP-28	SGP-29	SGP-30	SGP-31	SGP-32
1,1-Dichloroethane	<1.0	<1.0	<1.0	<1.0	71.2	<1.0
1,1,1-Trichloroethane	<1.0	<1.0	11.8	16.1	538.5	<1.0
Tetrachloroethene	<1.0	<1.0	44.9	48	1235.1	<1.0
Trichloroethene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

All results reported in units of Parts Per Billion (PPB) (or ug/l).

ALTERNATIVE 2: MONITORING
ESTIMATED CAPITAL COSTS

Project Name: Amphenol Corp. / Franklin Power Products
Project No.: 07026.08

Costs include installation of additional groundwater monitoring wells required to sample impacted off-site groundwater along Forsythe Street.

Assumptions:

(1). Three monitoring wells will be required.
(2). Monitoring wells will be flush mount type.
(3). Total monitoring well depth is 18 feet.
(4). Monitoring wells will be 4-inch diameter with 3-foot stainless steel screen and stainless steel casing.
(5). All work will be done under Level D protection.

SHIPPING FOR THIS PROJECT (%): (cost of shipping equipment to site as a percentage of total equipment cost)	10
ENGINEERING FOR THIS PROJECT (%): (estimate of engineering costs is based on total installed cost)	20
CONSTRUCTION MANAGEMENT FOR THIS PROJECT (%): (estimate of construction management costs is based on total installed cost)	10
CONTINGENCIES FOR THIS PROJECT (%): (based on total installed cost)	20

Unit costs for certain items presented in this estimate taken from 1995 Means Construction and ECHOS Environmental Restoration cost estimation catalogs. Other costs presented in this estimate based on vendor quotes or past experience.

Estimated Capital Costs - Alternative 2: Monitoring

ITEM #	WORK ITEM	UNIT	Estimated Quantity	Equip't/Mat'l Unit Price	Equip't/Mat'l Extended Price	Labor Unit Price	Labor Extended Price	Total Installed Price
1.	Monitoring Well Installation							
(1).	Mobilization/Demobilization	LS	1	$430	$430	$825	$825	$1,255
(2).	Crew Per Diem Expenses	DY	3	$0	$0	$95	$285	$285
(3).	Mud Drilling (4" diameter borehole)	LF	54	$6.40	$346	$12.30	$664	$1,010
(4).	Filter Pack	LF	9	$14.74	$133	$2.15	$19	$152
(5).	Concrete Surface Pad	EA	3	$3.50	$11	$1.50	$5	$15
(6).	Grout	LF	45	$1.67	$75	$0.00	$0	$75
(7).	Bentonite Seal	EA	3	$60.37	$181	$12.07	$36	$217
(8).	Drums for Well Cuttings	EA	3	$53.00	$159	$0.00	$0	$159
(9).	Manhole Cover	EA	3	$78.00	$234	$26.82	$80	$314
(10).	Well Casing	LF	45	$43.72	$1,967	$2.15	$97	$2,064
(11).	Well Screen	LF	9	$52.86	$476	$2.15	$19	$495
(12).	Move Drill Rig	EA	2	$25.84	$52	$13.40	$27	$78
(13).	Decontamination	EA	3	$8.00	$24	$45.00	$135	$160
(14).	Drum Disposal	EA	3	$0.00	$0	$50.00	$150	$150
2.	Monitoring Well Development							
(1).	Equipment Rental	WK	1	$427.00	$427	$0.00	$0	$427
(2).	Drums for Purge Water	EA	3	$53.00	$159	$0.00	$0	$159
(3).	Decontamination	EA	3	$8.00	$24	$45.00	$135	$160
3.	Professional Oversight							
(1).	Field Technician	HR	32	$0	$0	$50.00	$1,600	$1,600
(2).	Hydrogeologist	HR	16	$0	$0	$80.00	$1,280	$1,280
4.	Institutional Controls							
(1).	Deed Restrict/Entry Permit Recom'd	LS	1	$0	$0	$5,000	$5,000	$5,000

SUBTOTAL	$4,700	$10,400	$15,100

SUBTOTAL:	$15,100
SHIPPING:	$500
ENGINEERING:	$3,000
CONSTRUCTION MANAGEMENT:	$1,500
CONTINGENCIES:	$3,000
TOTAL (CAPITAL COSTS):	$23,100

ALTERNATIVE 2A: MONITORING; ICM

ESTIMATED CAPITAL COSTS

Project Name:	Amphenol Corp. / Franklin Power Products
Project No.:	07026.08

Costs include installation of additional groundwater monitoring wells required to sample impacted off-site groundwater along Forsythe Street.

Assumptions:

(1). Three monitoring wells will be required.
(2). Monitoring wells will be flush mount type.
(3). Total monitoring well depth is 18 feet.
(4). Monitoring wells will be 4-inch diameter with 3-foot stainless steel screen and stainless steel casing.
(5). All work will be done under Level D protection.
(6). ICM air stripping system is in place and operational.

SHIPPING FOR THIS PROJECT (%): (cost of shipping equipment to site as a percentage of total equipment cost)	10
ENGINEERING FOR THIS PROJECT (%): (estimate of engineering costs is based on total installed cost)	20
CONSTRUCTION MANAGEMENT FOR THIS PROJECT (%): (estimate of construction management costs is based on total installed cost)	10
CONTINGENCIES FOR THIS PROJECT (%): (based on total installed cost)	20

Unit costs for certain items presented in this estimate taken from 1995 Means Construction and ECHOS Environmental Restoration cost estimation catalogs. Other costs presented in this estimate based on vendor quotes or past experience.

Estimated Capital Costs - Alternative 2A: Monitoring; ICM

ITEM #	WORK ITEM	UNIT	Estimated Quantity	Equip't/Mat'l Unit Price	Equip't/Mat'l Extended Price	Labor Unit Price	Labor Extended Price	Total Installed Price
1.	Monitoring Well Installation							
(1).	Mobilization/Demobilization	LS	1	$430	$430	$825	$825	$1,255
(2).	Crew Per Diem Expenses	DY	3	$0	$0	$95	$285	$285
(3).	Mud Drilling (4" diameter borehole)	LF	54	$6.40	$346	$12.30	$664	$1,010
(4).	Filter Pack	LF	9	$14.74	$133	$2.15	$19	$152
(5).	Concrete Surface Pad	EA	3	$3.50	$11	$1.50	$5	$15
(6).	Grout	LF	45	$1.67	$75	$0.00	$0	$75
(7).	Bentonite Seal	EA	3	$60.37	$181	$12.07	$36	$217
(8).	Drums for Well Cuttings	EA	3	$53.00	$159	$0.00	$0	$159
(9).	Manhole Cover	EA	3	$78.00	$234	$26.82	$80	$314
(10).	Well Casing	LF	45	$43.72	$1,967	$2.15	$97	$2,064
(11).	Well Screen	LF	9	$52.86	$476	$2.15	$19	$495
(12).	Move Drill Rig	EA	2	$25.84	$52	$13.40	$27	$78
(13).	Decontamination	EA	3	$8.00	$24	$45.00	$135	$160
(14).	Drum Disposal	EA	3	$0.00	$0	$50.00	$150	$150
2.	Monitoring Well Development							
(1).	Equipment Rental	WK	1	$427.00	$427	$0.00	$0	$427
(2).	Drums for Purge Water	EA	3	$53.00	$159	$0.00	$0	$159
(3).	Decontamination	EA	3	$8.00	$24	$45.00	$135	$160
3.	Professional Oversight							
(1).	Field Technician	HR	32	$0	$0	$50.00	$1,600	$1,600
(2).	Hydrogeologist	HR	16	$0	$0	$80.00	$1,280	$1,280
4.	Institutional Controls							
(1).	Deed Restrict/Entry Permit Recom'd	LS	1	$0	$0	$5,000	$5,000	$5,000

SUBTOTAL	$4,700	$10,400	$15,100

SUBTOTAL:	$15,100
SHIPPING:	$500
ENGINEERING:	$3,000
CONSTRUCTION MANAGEMENT:	$1,500
CONTINGENCIES:	$3,000
TOTAL (CAPITAL COSTS):	$23,100

ALTERNATIVE 3: MONITORING; ICM; GROUNDWATER SPARGING AND SVE

ESTIMATED CAPITAL COSTS

Project Name:	Amphenol Corp. / Franklin Power Products
Project No.:	07026.08

Costs include installation of additional groundwater monitoring wells required to sample impacted off-site groundwater along Forsythe Street. Costs also include installation of air sparging wells, SVE wells, and associated equipment.

Assumptions:

(1). Three monitoring wells will be required.
(2). Monitoring wells will be flush mount type.
(3). Total monitoring well depth is 18 feet.
(4). Monitoring wells will be 4-inch diameter with 3 foot stainless steel screen and stainless steel casing.
(5). All work will be done under Level D protection.
(6). Twenty-two air sparging wells will be installed; five SVE wells will be installed.
(7). Total sparging well depth is 26 feet; total SVE well depth is 10 feet.
(8). Sparging wells will be 2-inch diameter with 2-foot stainless steel screen and stainless steel casing.
(9). SVE wells will be 4-inch diameter with 5-foot PVC screen and PVC casing.
(10). Air sparging and SVE wells will be on rotating operation to limit size requirements of blowers.
(11). No control of SVE system vapor emissions is included.
(12). ICM air stripping system is in place and operational.

SHIPPING FOR THIS PROJECT (%): (cost of shipping equipment to site as a percentage of total equipment cost)	10
ENGINEERING FOR THIS PROJECT (%): (estimate of engineering costs is based on total installed cost)	20
CONSTRUCTION MANAGEMENT FOR THIS PROJECT (%): (estimate of construction management costs is based on total installed cost)	10
CONTINGENCIES FOR THIS PROJECT (%): (based on total installed cost)	20

Unit costs for certain items presented in this estimate taken from 1995 Means Construction and ECHOS Environmental Restoration cost estimation catalogs. Other costs presented in this estimate based on vendor quotes or past experience.

Estimated Capital Costs - Alternative 3: Monitoring; ICM; Groundwater Sparging and SVE

ITEM #	WORK ITEM	UNIT	Estimated Quantity	Equip't/Mat'l Unit Price	Equip't/Mat'l Extended Price	Labor Unit Price	Labor Extended Price	Total Installed Price
1.	Monitoring Well Installation							
(1).	Mobilization/Demobilization	LS	1	$430	$430	$825	$825	$1,255
(2).	Crew Per Diem Expenses	DY	3	$0	$0	$95	$285	$285
(3).	Mud Drilling (4" diameter borehole)	LF	54	$6.40	$346	$12.30	$664	$1,010
(4).	Filter Pack	LF	9	$14.74	$133	$2.15	$19	$152
(5).	Concrete Surface Pad	EA	3	$3.50	$11	$1.50	$5	$15
(6).	Grout	LF	45	$1.67	$75	$0.00	$0	$75
(7).	Bentonite Seal	EA	3	$60.37	$181	$12.07	$36	$217
(8).	Drums for Well Cuttings	EA	3	$53.00	$159	$0.00	$0	$159
(9).	Manhole Cover	EA	3	$78.00	$234	$26.82	$80	$314
(10).	Well Casing	LF	45	$43.72	$1,967	$2.15	$97	$2,064
(11).	Well Screen	LF	9	$52.86	$476	$2.15	$19	$495
(12).	Move Drill Rig	EA	2	$25.84	$52	$13.40	$27	$78
(13).	Decontamination	EA	3	$8.00	$24	$45.00	$135	$160
(14).	Drum Disposal	EA	3	$0.00	$0	$50.00	$150	$150
2.	Monitoring Well Development							
(1).	Equipment Rental	WK	1	$427.00	$427	$0.00	$0	$427
(2).	Drums for Purge Water	EA	3	$53.00	$159	$0.00	$0	$159
(3).	Decontamination	EA	3	$8.00	$24	$45.00	$135	$160
3.	Professional Oversight							
(1).	Field Technician	HR	32	$0	$0	$50.00	$1,600	$1,600
(2).	Hydrogeologist	HR	16	$0	$0	$80.00	$1,280	$1,280
4.	Institutional Controls							
(1).	Deed Restrict/Entry Permit Recom'd	LS	1	$0	$0	$5,000	$5,000	$5,000

5. Air Sparging Wells

(1).	Crew Per Diem Expenses	DY	11	$0	$0	$95	$1,045	$1,045
(2).	Mud Drilling (2" diameter borehole)	LF	572	$4.90	$2,803	$11.60	$6,635	$9,438
(3).	Filter Pack	LF	44	$8.50	$374	$1.50	$66	$440
(4).	Concrete Surface Pad	EA	22	$3.50	$77	$1.50	$33	$110
(5).	Grout	LF	528	$1.11	$586	$0.00	$0	$586
(6).	Bentonite Seal	EA	22	$25.00	$550	$6.00	$132	$682
(7).	Drums for Well Cuttings	EA	22	$53.00	$1,166	$0.00	$0	$1,166
(8).	Manhole Cover	EA	22	$78.00	$1,716	$26.82	$590	$2,306
(9).	Well Casing (2" S.S.)	LF	528	$19.30	$10,190	$1.69	$892	$11,083
(10).	Well Screen (2" S.S.)	LF	44	$44.32	$1,950	$1.43	$63	$2,013
(11).	Move Drill Rig	EA	21	$25.84	$543	$13.40	$281	$824
(12).	Decontamination	EA	1	$10.00	$10	$60.00	$60	$70
(13).	Drum Disposal	EA	22	$0.00	$0	$325.00	$7,150	$7,150

6. SVE Well Drilling & Completion

(1).	Crew Per Diem Expenses	DY	2	$0	$0	$95	$190	$190
(2).	Mud Drilling (4" diameter borehole)	LF	50	$6.40	$320	$12.30	$615	$935
(3).	Filter Pack	LF	25	$14.74	$369	$2.15	$54	$422
(4).	Concrete Surface Pad	EA	5	$11.70	$59	$2.80	$14	$73
(5).	Grout	LF	25	$1.67	$42	$0.00	$0	$42
(6).	Bentonite Seal	EA	5	$60.37	$302	$12.07	$60	$362
(7).	Drums for Well Cuttings	EA	4	$53.00	$212	$0.00	$0	$212
(8).	12" Manhole Cover	EA	5	$105.00	$525	$26.82	$134	$659
(9).	Well Casing (4" PVC)	LF	25	$12.50	$313	$2.15	$54	$366
(10).	Well Screen (4" PVC)	LF	25	$14.50	$363	$2.15	$54	$416
(11).	Move Drill Rig	EA	4	$25.84	$103	$13.40	$54	$157
(12).	Decontamination	EA	1	$10.00	$10	$60.00	$60	$70
(13).	Drum Disposal	EA	3	$0.00	$0	$325.00	$975	$980

7. Air Sparging Header Piping, Lateral Piping, Valves

(1).	Header Piping (6-inch)	LF	775	$4.08	$3,162	$5.21	$4,038	$7,200
(2).	Lateral Piping (2-inch, 10 LF each well)	LF	220	$1.45	$319	$5.46	$1,201	$1,520
(3).	Trenching/Backfill/Compaction	LF	850	$0	$0	$5.50	$4,675	$4,680
(4).	Flow Monitoring Stations	EA	22	$100	$2,200	$20.00	$440	$2,640

(5).	Isolation Valves	EA	22	$65	$1,430	$16.56	$364	$1,794
(6).	Throttling valves	EA	22	$65	$1,430	$16.56	$364	$1,794
8.	Air Sparging Blower and Accessories							
(1).	Blower (250 CFM @ 10 PSIG)	EA	1	$8,400	$8,400	$750	$750	$9,150
(2).	Suction and Discharge Piping (6-inch)	LS	1	$500	$500	$500	$500	$1,000
(3).	Electrical Terminations	LS	1	$0	$0	$500	$500	$500
9.	Soil Vapor Extraction Header Piping, Lateral Piping, and Valves							
(1).	Header Piping (6-inch)	LF	625	$4.08	$2,550	$5.21	$3,256	$5,806
(2).	Lateral Piping (2-inch)	LF	60	$1.45	$87	$5.46	$328	$415
(3).	Trenching/Backfill/Compaction	LF	300	$0	$0	$5.50	$1,650	$1,650
(4).	Flow Monitoring Stations	EA	5	$100	$500	$20.00	$100	$600
(5).	Isolation Valves	EA	5	$65	$325	$16.56	$83	$408
(6).	Throttling valves	EA	5	$65	$325	$16.56	$83	$408
10.	Soil Vapor Extraction Blower and Accessories							
(1).	Blower (400 CFM @ 60" w.c. vac)	EA	1	$13,200	$13,200	$235	$235	$13,435
(2).	Suction and Discharge Piping (6-inch)	LS	1	$500	$500	$500	$500	$1,000
(3).	Electrical Terminations	LS	1	$0	$0	$500	$500	$500
11.	Enclosure							
(1).	Wood Sided Storage Garage	SF	80	$12	$960	$15	$1,200	$2,160
(2).	8" slab on grade	SF	80	$3.75	$300	$1.75	$140	$440
(4).	Signage	EA	10	$30.00	$300	$20.00	$200	$500
12.	Utilities							
(1).	Electrical Service to Enclosure	LS	1	$500.00	$500	$1,500.00	$1,500	$2,000
	SUBTOTAL:				$64,300		$52,200	$116,500

SUBTOTAL:	$116,500
SHIPPING:	$6,400
ENGINEERING:	$23,300
CONSTRUCTION MANAGEMENT:	$11,700
CONTINGENCIES:	$23,300
TOTAL (CAPITAL COSTS):	$181,200

ALTERNATIVE 4: MONITORING; ICM; EXCAVATION OF IMPACTED SOIL; ON-SITE AERATION

ESTIMATED CAPITAL COSTS

Project Name:	Amphenol Corp. / Franklin Power Products
Project No.:	07026.08

Costs include installation of additional groundwater monitoring wells required to sample impacted off-site groundwater along Forsythe Street.
Costs also include the excavation and on-site aeration of the soil.
Excavated overburden will be replaced immediately; impacted soils will be replaced following treatment.
Groundwater collected from the excavation will be staged, treated, and discharged to the sanitary sewer.

Assumptions:

(1). Three monitoring wells will be required.
(2). Monitoring wells will be flush mount type.
(3). Total monitoring well depth is 18 feet.
(4). Monitoring wells will be 4-inch diameter with 3 foot stainless steel screen and stainless steel casing.
(5). Depth to water table is from 14 to 15 feet at the excavation site.
(6). Soil excavation expansion factor is 1.2.
(7). Groundwater volume requiring disposal is based on a sand porosity of 25% and assumes that clay soils will have minimal free water.
(8). Depth of soil excavation is 20 feet using a 1:1 side slope.
(9). All work can be conducted under level D protection.
(10). ICM air stripping system is in place and operational; no impact on system from excavation.
(11). No air monitoring required during excavation.

SHIPPING FOR THIS PROJECT (%): (cost of shipping equipment to site as a percentage of total equipment cost)	10
ENGINEERING FOR THIS PROJECT (%): (estimate of engineering costs is based on total installed cost)	20
CONSTRUCTION MANAGEMENT FOR THIS PROJECT (%): (estimate of construction management costs is based on total installed cost)	10
CONTINGENCIES FOR THIS PROJECT (%): (based on total installed cost)	20

Unit costs for certain items presented in this estimate taken from 1995 Means Construction and ECHOS Environmental Restoration cost estimation catalogs. Other costs presented in this estimate based on vendor quotes or past experience.

Estimated Capital Costs - Alternative 4: Monitoring; ICM; Excavation/Aeration of Impacted Soil

ITEM #	WORK ITEM	UNIT	Estimated Quantity	Equip't/Mat'l Unit Price	Equip't/Mat'l Extended Price	Labor Unit Price	Labor Extended Price	Total Installed Price
1.	Monitoring Well Installation							
(1).	Mobilization/Demobilization	LS	1	$430	$430	$825	$825	$1,255
(2).	Crew Per Diem Expenses	DY	3	$0	$0	$95	$285	$285
(3).	Mud Drilling (4" diameter borehole)	LF	54	$6.40	$346	$12.30	$664	$1,010
(4).	Filter Pack	LF	9	$14.74	$133	$2.15	$19	$152
(5).	Concrete Surface Pad	EA	3	$3.50	$11	$1.50	$5	$15
(6).	Grout	LF	45	$1.67	$75	$0.00	$0	$75
(7).	Bentonite Seal	EA	3	$60.37	$181	$12.07	$36	$217
(8).	Drums for Well Cuttings	EA	3	$53.00	$159	$0.00	$0	$159
(9).	Manhole Cover	EA	3	$78.00	$234	$26.82	$80	$314
(10).	Well Casing	LF	45	$43.72	$1,967	$2.15	$97	$2,064
(11).	Well Screen	LF	9	$52.86	$476	$2.15	$19	$495
(12).	Move Drill Rig	EA	2	$25.84	$52	$13.40	$27	$78
(13).	Decontamination	EA	3	$8.00	$24	$45.00	$135	$160
(14).	Drum Disposal	EA	3	$0.00	$0	$50.00	$150	$150
2.	Monitoring Well Development							
(1).	Equipment Rental	WK	1	$427.00	$427	$0.00	$0	$427
(2).	Drums for Purge Water	EA	3	$53.00	$159	$0.00	$0	$159
(3).	Decontamination	EA	3	$8.00	$24	$45.00	$135	$160
3.	Professional Oversight							
(1).	Field Technician	HR	32	$0	$0	$50.00	$1,600	$1,600
(2).	Hydrogeologist	HR	16	$0	$0	$80.00	$1,280	$1,280
4.	Institutional Controls							
(1).	Deed Restrict/Entry Permit Recom'd	LS	1	$0	$0	$5,000	$5,000	$5,000

5.	Excavation of Contaminated Soils and Replacement of Overburden							
(1).	Mobilization/demobilization	LS	1	$0	$0	$1,000	$1,000	$1,000
(2).	Crew Per Diem Expenses	DY	14	$0	$0	$95	$1,330	$1,330
(3).	Excavate	CY	4400	$0	$0	$1.83	$8,052	$8,052
(5).	Replace overburden (stockpiled)	CY	3770	$0	$0	$1.38	$5,203	$5,203
(6).	Compaction	CY	3770	$0	$0	$2.27	$8,558	$8,558
(7).	Soil sampling/analysis for verification	EA	10	$0	$0	$215.00	$2,150	$2,150
(8).	Decontamination	EA	2	$30.00	$60	$200.00	$400	$460
6.	Groundwater Handling and Disposal							
(1).	4" pump, including hose	DY	10	$39.90	$399	$67.50	$675	$1,070
(2).	Modular Tank Rental (8,000 gal)	MN	1	$2,500	$2,500	$750	$750	$3,250
(3).	Water aeration with blower	MN	1	$1,200	$1,200	$300	$300	$1,500
(4).	Disposal of recovered groundwater	GAL	7000	$0	$0	$0.01	$70	$70
7.	On-Site Aeration							
(1).	Place Soils In Windrows	CY	630	$0	$0	$3.10	$1,953	$1,953
(2).	Soil Aeration by Tilling	DY	10	$0	$0	$500	$5,000	$5,000
(3).	Composite soil sampling and analysis	EA	20	$0	$0	$225.00	$4,500	$4,500
(4).	Fencing (6 ft chain link)	LF	1600	$9.00	$14,400	$1.00	$1,600	$16,000
8.	Replacement of Treated Soils and Topsoil							
(1).	Mobilization/demobilization	LS	1	$0	$0	$750	$750	$750
(2).	Crew Per Diem Expenses	DY	6	$0	$0	$95	$570	$570
(3).	Replace Treated Soils	CY	630	$0	$0	$1.75	$1,103	$1,103
(4).	Replace Topsoil (stockpiled)	CY	100	$0	$0	$1.38	$138	$138
(5).	Compaction	CY	700	$0	$0	$2.27	$1,589	$1,589
(6).	Fine grading and seeding	SY	980	$0.22	$216	$1.69	$1,656	$1,872
	SUBTOTAL				$23,500		$57,700	$81,200

SUBTOTAL:	$81,200
SHIPPING:	$2,400
ENGINEERING:	$16,200
CONSTRUCTION MANAGEMENT:	$8,100
CONTINGENCIES:	$16,200
TOTAL (CAPITAL COSTS):	$124,100

ALTERNATIVE 4A: MONITORING; ICM; EXCAVATION OF IMPACTED SOIL; OFF-SITE DISPOSAL
ESTIMATED CAPITAL COSTS

Project Name:	Amphenol Corp. / Franklin Power Products
Project No.:	07026.08

Costs include installation of additional groundwater monitoring wells required to sample impacted off-site groundwater along Forsythe Street.
Costs also include the excavation and off-site disposal of on-site soil at a Type II landfill.
Excavated soil will be replaced with clean fill brought from off-site.
Groundwater collected from the excavation will be staged, treated, and discharged to the sanitary sewer.

Assumptions:

(1). Three monitoring wells will be required.
(2). Monitoring wells will be flush mount type.
(3). Total monitoring well depth is 18 feet.
(4). Monitoring wells will be 4-inch diameter with 3 foot stainless steel screen and stainless steel casing.
(5). Depth to water table is from 14 to 15 feet at the excavation site.
(6). Soil excavation expansion factor is 1.2.
(7). Groundwater volume requiring disposal is based on a sand porosity of 25% and assumes that clay soils will have minimal free water.
(8). Depth of soil excavation is 20 feet using a 1:1 side slope.
(9). All work can be conducted under level D protection.
(10). ICM air stripping system is in place and operational; no impact on system from excavation.
(11). No air monitoring required during excavation.
(12). Off-site disposal will require incineration of the contaminated soils; disposal as a non-hazardous material.

SHIPPING FOR THIS PROJECT (%): (cost of shipping equipment to site as a percentage of total equipment cost)	10
ENGINEERING FOR THIS PROJECT (%): (estimate of engineering costs is based on total installed cost)	20
CONSTRUCTION MANAGEMENT FOR THIS PROJECT (%): (estimate of construction management costs is based on total installed cost)	10
CONTINGENCIES FOR THIS PROJECT (%): (based on total installed cost)	20

Unit costs for certain items presented in this estimate taken from 1995 Means Construction and ECHOS Environmental Restoration cost estimation catalogs. Other costs presented in this estimate based on vendor quotes or past experience.

Estimated Capital Costs - Alternative 4A: Monitoring; ICM; Excavation/Disposal of Impacted Soil

ITEM #	WORK ITEM	UNIT	Estimated Quantity	Equip't/Mat'l Unit Price	Equip't/Mat'l Extended Price	Labor Unit Price	Labor Extended Price	Total Installed Price
1.	Monitoring Well Installation							
(1).	Mobilization/Demobilization	LS	1	$430	$430	$825	$825	$1,255
(2).	Crew Per Diem Expenses	DY	3	$0	$0	$95	$285	$285
(3).	Mud Drilling (4" diameter borehole)	LF	54	$6.40	$346	$12.30	$664	$1,010
(4).	Filter Pack	LF	9	$14.74	$133	$2.15	$19	$152
(5).	Concrete Surface Pad	EA	3	$3.50	$11	$1.50	$5	$15
(6).	Grout	LF	45	$1.67	$75	$0.00	$0	$75
(7).	Bentonite Seal	EA	3	$60.37	$181	$12.07	$36	$217
(8).	Drums for Well Cuttings	EA	3	$53.00	$159	$0.00	$0	$159
(9).	Manhole Cover	EA	3	$78.00	$234	$26.82	$80	$314
(10).	Well Casing	LF	45	$43.72	$1,967	$2.15	$97	$2,064
(11).	Well Screen	LF	9	$52.86	$476	$2.15	$19	$495
(12).	Move Drill Rig	EA	2	$25.84	$52	$13.40	$27	$78
(13).	Decontamination	EA	3	$8.00	$24	$45.00	$135	$160
(14).	Drum Disposal	EA	3	$0.00	$0	$50.00	$150	$150
2.	Monitoring Well Development							
(1).	Equipment Rental	WK	1	$427.00	$427	$0.00	$0	$427
(2).	Drums for Purge Water	EA	3	$53.00	$159	$0.00	$0	$159
(3).	Decontamination	EA	3	$8.00	$24	$45.00	$135	$160
3.	Professional Oversight							
(1).	Field Technician	HR	32	$0	$0	$50.00	$1,600	$1,600
(2).	Hydrogeologist	HR	16	$0	$0	$80.00	$1,280	$1,280
4.	Institutional Controls							
(1).	Deed Restrict/Entry Permit Recom'd	LS	1	$0	$0	$5,000	$5,000	$5,000

5. Excavation of Contaminated Soils and Replacement with Clean Fill

(1).	Mobilization/demobilization	LS	1	$0	$0	$1,000	$1,000	$1,000
(2).	Crew Per Diem Expenses	DY	20	$0	$0	$95	$1,900	$1,900
(3).	Excavate	CY	4400	$0	$0	$1.83	$8,052	$8,052
(4).	Clean fill (haul, place, spread)	CY	530	$8.53	$4,521	$4.17	$2,210	$6,731
(5).	Replace overburden (stockpiled)	CY	3870	$0	$0	$1.38	$5,341	$5,341
(6).	Compaction	CY	4400	$0	$0	$2.27	$9,988	$9,988
(7).	Fine grading and seeding	SY	980	$0.22	$216	$1.69	$1,656	$1,872
(8).	Composite soil sampling and analysis	EA	20	$0	$0	$225.00	$4,500	$4,500
(9).	Install Fencing (6 ft chain link)	LF	200	$9.00	$1,800	$1.00	$200	$2,000
(10).	Remove Fencing	LF	200	$0	$0	$0.75	$150	$150
(11).	Decontamination	EA	2	$30.00	$60	$200.00	$400	$460

6. Groundwater Handling and Disposal

(1).	4" pump, including hose	DY	10	$39.90	$399	$67.50	$675	$1,070
(2).	Modular Tank Rental (8,000 gal)	MN	1	$2,500	$2,500	$750	$750	$3,250
(3).	Water aeration with blower	MN	1	$1,200	$1,200	$300	$300	$1,500
(4).	Disposal of recovered groundwater	GAL	7000	$0	$0	$0.01	$70	$70

7. Off-Site Disposal (Type II landfill)

(1).	Haul and dispose	CY	630	$0	$0	$38.40	$24,192	$24,192
(2).	Incineration Fee	CY	630	$0	$0	$1,250	$787,500	$787,500
(3).	Tipping Fee	CY	630	$0	$0	$35	$22,050	$22,050
	SUBTOTAL				$15,400		$881,300	$896,700

SUBTOTAL:	$896,700
SHIPPING:	$1,500
ENGINEERING:	$179,300
CONSTRUCTION MANAGEMENT:	$89,700
CONTINGENCIES:	$179,300
TOTAL (CAPITAL COSTS):	$1,346,500

ALTERNATIVE 5: MONITORING; ICM; FOCUSED GROUNDWATER SPARGING AND SVE
ESTIMATED CAPITAL COSTS

Project Name:	Amphenol Corp. / Franklin Power Products
Project No.:	07026.08

Costs include installation of additional groundwater monitoring wells required to sample impacted off-site groundwater along Forsythe Street. Costs also include installation of air sparging wells, SVE wells, and associated equipment.

Assumptions:

(1). Three monitoring wells will be required.
(2). Monitoring wells will be flush mount type.
(3). Total monitoring well depth is 18 feet.
(4). Monitoring wells will be 4-inch diameter with 3 foot stainless steel screen and stainless steel casing.
(5). All work will be done under Level D protection.
(6). Ten air sparging wells will be installed; two SVE wells will be installed.
(7). Total sparging well depth is 26 feet; total SVE well depth is 10 feet.
(8). Sparging wells will be 2-inch diameter with 2-foot stainless steel screen and stainless steel casing.
(9). SVE wells will be 4-inch diameter with 5-foot PVC screen and PVC casing.
(10). Air sparging and SVE wells will be on rotating operation to limit size requrements of blowers.
(11). No control of SVE system vapor emissions is included.
(12). ICM air stripping system is in place and operational.

SHIPPING FOR THIS PROJECT (%): (cost of shipping equipment to site as a percentage of total equipment cost)	10
ENGINEERING FOR THIS PROJECT (%): (estimate of engineering costs is based on total installed cost)	20
CONSTRUCTION MANAGEMENT FOR THIS PROJECT (%): (estimate of construction management costs is based on total installed cost)	10
CONTINGENCIES FOR THIS PROJECT (%): (based on total installed cost)	20

Unit costs for certain items presented in this estimate taken from 1995 Means Construction and ECHOS Environmental Restoration cost estimation catalogs. Other costs presented in this estimate based on vendor quotes or past experience.

Estimated Capital Costs - Alternative 5: Monitoring; ICM; Focused Groundwater Sparging and SVE

ITEM #	WORK ITEM	UNIT	Estimated Quantity	Equip't/Mat'l Unit Price	Equip't/Mat'l Extended Price	Labor Unit Price	Labor Extended Price	Total Installed Price
1.	Monitoring Well Installation							
(1).	Mobilization/Demobilization	LS	1	$430	$430	$825	$825	$1,255
(2).	Crew Per Diem Expenses	DY	3	$0	$0	$95	$285	$285
(3).	Mud Drilling (4" diameter borehole)	LF	54	$6.40	$346	$12.30	$664	$1,010
(4).	Filter Pack	LF	9	$14.74	$133	$2.15	$19	$152
(5).	Concrete Surface Pad	EA	3	$3.50	$11	$1.50	$5	$15
(6).	Grout	LF	45	$1.67	$75	$0.00	$0	$75
(7).	Bentonite Seal	EA	3	$60.37	$181	$12.07	$36	$217
(8).	Drums for Well Cuttings	EA	3	$53.00	$159	$0.00	$0	$159
(9).	Manhole Cover	EA	3	$78.00	$234	$26.82	$80	$314
(10).	Well Casing	LF	45	$43.72	$1,967	$2.15	$97	$2,064
(11).	Well Screen	LF	9	$52.86	$476	$2.15	$19	$495
(12).	Move Drill Rig	EA	2	$25.84	$52	$13.40	$27	$78
(13).	Decontamination	EA	3	$8.00	$24	$45.00	$135	$160
(14).	Drum Disposal	EA	3	$0.00	$0	$50.00	$150	$150
2.	Monitoring Well Development							
(1).	Equipment Rental	WK	1	$427.00	$427	$0.00	$0	$427
(2).	Drums for Purge Water	EA	3	$53.00	$159	$0.00	$0	$159
(3).	Decontamination	EA	3	$8.00	$24	$45.00	$135	$160
3.	Professional Oversight							
(1).	Field Technician	HR	32	$0	$0	$50.00	$1,600	$1,600
(2).	Hydrogeologist	HR	16	$0	$0	$80.00	$1,280	$1,280
4.	Institutional Controls							
(1).	Deed Restrict/Entry Permit Recom'd	LS	1	$0	$0	$5,000	$5,000	$5,000

5. Air Sparging Wells

(1).	Crew Per Diem Expenses	DY	5	$0	$0	$95	$475	$475
(2).	Mud Drilling (2" diameter borehole)	LF	260	$4.90	$1,274	$11.60	$3,016	$4,290
(3).	Filter Pack	LF	20	$8.50	$170	$1.50	$30	$200
(4).	Concrete Surface Pad	EA	10	$3.50	$35	$1.50	$15	$50
(5).	Grout	LF	240	$1.11	$266	$0.00	$0	$266
(6).	Bentonite Seal	EA	10	$25.00	$250	$6.00	$60	$310
(7).	Drums for Well Cuttings	EA	10	$53.00	$530	$0.00	$0	$530
(8).	Manhole Cover	EA	10	$78.00	$780	$26.82	$268	$1,048
(9).	Well Casing (2" S.S.)	LF	240	$19.30	$4,632	$1.69	$406	$5,038
(10).	Well Screen (2" S.S.)	LF	20	$44.32	$886	$1.43	$29	$915
(11).	Move Drill Rig	EA	9	$25.84	$233	$13.40	$121	$353
(12).	Decontamination	EA	1	$10.00	$10	$60.00	$60	$70
(13).	Drum Disposal	EA	10	$0.00	$0	$325.00	$3,250	$3,250

6. SVE Well Drilling & Completion

(1).	Crew Per Diem Expenses	DY	1	$0	$0	$95	$95	$95
(2).	Mud Drilling (4" diameter borehole)	LF	20	$6.40	$128	$12.30	$246	$374
(3).	Filter Pack	LF	10	$14.74	$147	$2.15	$22	$169
(4).	Concrete Surface Pad	EA	2	$11.70	$23	$2.80	$6	$29
(5).	Grout	LF	10	$1.67	$17	$0.00	$0	$17
(6).	Bentonite Seal	EA	2	$60.37	$121	$12.07	$24	$145
(7).	Drums for Well Cuttings	EA	1	$53.00	$53	$0.00	$0	$53
(8).	12" Manhole Cover	EA	2	$105.00	$210	$26.82	$54	$264
(9).	Well Casing (4" PVC)	LF	10	$12.50	$125	$2.15	$22	$147
(10).	Well Screen (4" PVC)	LF	10	$14.50	$145	$2.15	$22	$167
(11).	Move Drill Rig	EA	1	$25.84	$26	$13.40	$13	$39
(12).	Decontamination	EA	1	$10.00	$10	$60.00	$60	$70
(13).	Drum Disposal	EA	1	$0.00	$0	$325.00	$325	$330

7. Air Sparging Header Piping, Lateral Piping, Valves

(1).	Header Piping (6-inch)	LF	300	$4.08	$1,224	$5.21	$1,563	$2,787
(2).	Lateral Piping (2-inch, 10 LF each well)	LF	100	$1.45	$145	$5.46	$546	$691
(3).	Trenching/Backfill/Compaction	LF	350	$0	$0	$5.50	$1,925	$1,930
(4).	Flow Monitoring Stations	EA	10	$100	$1,000	$20.00	$200	$1,200

(5).	Isolation Valves	EA	10	$65	$650	$16.56	$166	$816
(6).	Throttling valves	EA	10	$65	$650	$16.56	$166	$816
8.	Air Sparging Blower and Accessories							
(1).	Blower (200 CFM @ 10 PSIG)	EA	1	$6,300	$6,300	$750	$750	$7,050
(2).	Suction and Discharge Piping (6-inch)	LS	1	$500	$500	$500	$500	$1,000
(3).	Electrical Terminations	LS	1	$0	$0	$500	$500	$500
9.	Soil Vapor Extraction Header Piping, Lateral Piping, and Valves							
(1).	Header Piping (6-inch)	LF	250	$4.08	$1,020	$5.21	$1,303	$2,323
(2).	Lateral Piping (2-inch)	LF	40	$1.45	$58	$5.46	$218	$276
(3).	Trenching/Backfill/Compaction	LF	250	$0	$0	$5.50	$1,375	$1,380
(4).	Flow Monitoring Stations	EA	2	$100	$200	$20.00	$40	$240
(5).	Isolation Valves	EA	2	$65	$130	$16.56	$33	$163
(6).	Throttling valves	EA	2	$65	$130	$16.56	$33	$163
10.	Soil Vapor Extraction Blower and Accessories							
(1).	Blower (400 CFM @ 60" w.c. vac)	EA	1	$14,200	$14,200	$235	$235	$14,435
(2).	Suction and Discharge Piping (6-inch)	LS	1	$500	$500	$500	$500	$1,000
(3).	Electrical Terminations	LS	1	$0	$0	$500	$500	$500
11.	Enclosure							
(1).	Wood Sided Storage Garage	SF	80	$12	$960	$15	$1,200	$2,160
(2).	8" slab on grade	SF	80	$3.75	$300	$1.75	$140	$440
(4).	Signage	EA	10	$30.00	$300	$20.00	$200	$500
12.	Utilities							
(1).	Electrical Service to Enclosure	LS	1	$500.00	$500	$1,500.00	$1,500	$2,000
	SUBTOTAL:				$43,500		$32,600	$76,100

SUBTOTAL:	$76,100
SHIPPING:	$4,400
ENGINEERING:	$15,200
CONSTRUCTION MANAGEMENT:	$7,600
CONTINGENCIES:	$15,200
TOTAL (CAPITAL COSTS):	$118,500

ALTERNATIVE 6: MONITORING; ICM; ACTIVATED CARBON ADSORPTION; REINJECTION
ESTIMATED CAPITAL COSTS

Project Name:	Amphenol Corp. / Franklin Power Products
Project No.:	07026.08

Costs include installation of additional groundwater monitoring wells required to sample impacted off-site groundwater along Forsythe Street. Costs also include installation of an activated carbon system, associated transmission piping, reinjection wells and/or reinfiltration galleries.

Assumptions:

(1). Three monitoring wells will be required.
(2). Monitoring wells will be flush mount type.
(3). Total monitoring well depth is 18 feet.
(4). Monitoring wells will be 4-inch diameter with 3 foot stainless steel screen and stainless steel casing.
(5). All work will be done under Level D protection.
(6). Activated carbon cells will be sized to handle the full flow from the ICM air stripper.
(7). Approximately 20% of the treated groundwater will be disharged to the sanitary sewer; 80% will be reinjected.
(8). Two injection wells will be required.
(9). Total injection well depth is 26 feet.
(10). Injection wells will be 6-inch diameter with 5 foot PVC screen and PVC casing.
(11). ICM air stripping system is in place and operational.

SHIPPING FOR THIS PROJECT (%): (cost of shipping equipment to site as a percentage of total equipment cost)	10
ENGINEERING FOR THIS PROJECT (%): (estimate of engineering costs is based on total installed cost)	20
CONSTRUCTION MANAGEMENT FOR THIS PROJECT (%): (estimate of construction management costs is based on total installed cost)	10
CONTINGENCIES FOR THIS PROJECT (%): (based on total installed cost)	20

Unit costs for certain items presented in this estimate taken from 1995 Means Construction and ECHOS Environmental Restoration cost estimation catalogs. Other costs presented in this estimate based on vendor quotes or past experience.

Estimated Capital Costs - Alternative 6: Monitoring; ICM; Carbon Adsorption; Reinjection

ITEM #	WORK ITEM	UNIT	Estimated Quantity	Equip't/Mat'l Unit Price	Equip't/Mat'l Extended Price	Labor Unit Price	Labor Extended Price	Total Installed Price
1.	Monitoring Well Installation							
(1).	Mobilization/Demobilization	LS	1	$430	$430	$825	$825	$1,255
(2).	Crew Per Diem Expenses	DY	3	$0	$0	$95	$285	$285
(3).	Mud Drilling (4" diameter borehole)	LF	54	$6.40	$346	$12.30	$664	$1,010
(4).	Filter Pack	LF	9	$14.74	$133	$2.15	$19	$152
(5).	Concrete Surface Pad	EA	3	$3.50	$11	$1.50	$5	$15
(6).	Grout	LF	45	$1.67	$75	$0.00	$0	$75
(7).	Bentonite Seal	EA	3	$60.37	$181	$12.07	$36	$217
(8).	Drums for Well Cuttings	EA	3	$53.00	$159	$0.00	$0	$159
(9).	Manhole Cover	EA	3	$78.00	$234	$26.82	$80	$314
(10).	Well Casing	LF	45	$43.72	$1,967	$2.15	$97	$2,064
(11).	Well Screen	LF	9	$52.86	$476	$2.15	$19	$495
(12).	Move Drill Rig	EA	2	$25.84	$52	$13.40	$27	$78
(13).	Decontamination	EA	3	$8.00	$24	$45.00	$135	$160
(14).	Drum Disposal	EA	3	$0.00	$0	$50.00	$150	$150
2.	Monitoring Well Development							
(1).	Equipment Rental	WK	1	$427.00	$427	$0.00	$0	$427
(2).	Drums for Purge Water	EA	3	$53.00	$159	$0.00	$0	$159
(3).	Decontamination	EA	3	$8.00	$24	$45.00	$135	$160
3.	Professional Oversight							
(1).	Field Technician	HR	32	$0	$0	$50.00	$1,600	$1,600
(2).	Hydrogeologist	HR	16	$0	$0	$80.00	$1,280	$1,280
4.	Institutional Controls							
(1).	Deed Restrict/Entry Permit Recom'd	LS	1	$0	$0	$5,000	$5,000	$5,000

5. Activated Carbon System/Transmission Piping

(1).	HDPE Carbon Cells (25 gpm)	EA	2	$3,200	$6,400	$250.00	$500	$6,900
(2).	Activated Carbon (400 lb./cell)	LB	800	$1.75	$1,400	$0.00	$0	$1,400
(3).	2" Sch 80 PVC Header w/valves	LS	1	$600	$600	$900.00	$900	$1,500
(4).	Interim Holding Tank (500 gal - HDPE)	EA	1	$425	$425	$50.00	$50	$480
(5).	Carbon Cell/Reinjection Pump	EA	1	$875	$875	$200.00	$400	$1,280
(6).	Isolation Valves	EA	4	$65.00	$260	$16.56	$66	$330
(7).	Throttling Valves	EA	2	$65.00	$130	$16.56	$33	$160
(8).	Flow/Pressure Indication	EA	2	$500.00	$1,000	$90.00	$180	$1,180
(9).	Trans. Piping/Fittings (2" sch 80 PVC)	LF	725	$1.45	$1,051	$5.46	$3,959	$5,010
(10).	Trenching/Backfill/Compaction	LF	650	$0	$0	$5.50	$3,575	$3,580

6. Reinjection Wells

(1).	Crew Per Diem Expenses	DY	2	$0	$0	$95	$190	$190
(2).	Mud Drilling (6" diameter borehole)	LF	52	$8.40	$437	$15.30	$796	$1,232
(3).	Filter Pack	LF	10	$16.44	$164	$2.45	$25	$189
(4).	Concrete Surface Pad	EA	2	$11.70	$23	$2.80	$6	$29
(5).	Grout	LF	42	$2.35	$99	$0.00	$0	$99
(6).	Bentonite Seal	EA	2	$64.37	$129	$12.07	$24	$153
(7).	Drums for Well Cuttings	EA	2	$53.00	$106	$0.00	$0	$106
(8).	Manhole Cover	EA	2	$105.00	$210	$26.82	$54	$264
(9).	Well Casing (6" PVC)	LF	42	$19.50	$819	$5.75	$242	$1,061
(10).	Well Screen (6" PVC)	LF	10	$24.50	$245	$5.50	$55	$300
(11).	Move Drill Rig	EA	1	$25.84	$26	$13.40	$13	$39
(12).	Decontamination	EA	1	$15.00	$15	$150.00	$150	$170
(13).	Drum Disposal	EA	2	$0.00	$0	$325.00	$650	$650

7. Enclosure

(1).	Wood Sided Storage Garage	SF	80	$12	$960	$15	$1,200	$2,160
(2).	8" slab on grade	SF	80	$3.75	$300	$1.75	$140	$440
(3).	Signage	EA	10	$30.00	$300	$20.00	$200	$500

8. Utilities

(1).	Electrical Service to Enclosure	LS	1	$500.00	$500	$1,500.00	$1,500	$2,000
	SUBTOTAL:				$21,200		$25,300	$46,500

SUBTOTAL:	$46,500
SHIPPING:	$2,100
ENGINEERING:	$9,300
CONSTRUCTION MANAGEMENT:	$4,700
CONTINGENCIES:	$9,300
TOTAL (CAPITAL COSTS):	$71,900

ALTERNATIVE 2: MONITORING
ESTIMATED ANNUAL OPERATING COSTS

PROJECT: Amphenol Corp. / Franklin Power Products
PROJECT NUMBER: 07026.08

Costs presented are for semi-annual monitoring of select VOCs in groundwater, surface water, and soils for the Former Amphenol site. The following assumptions have been made:

(1). 17 existing groundwater monitoring wells and 3 new monitoring wells will require sampling.
(2). 5 surface water locations will require sampling.
(3). Sampling will be done on a semi-annual basis for a total of 12 years.
(4). Water samples will be analyzed for TCE, TCA, and PCE only.
(5). Soil samples will be obtained from 10 locations and at a depth of 18 to 24 feet at each location.
(6). Soil sample volume will be 125 ml.
(7). Soil samples will be obtained using a hydraulically driven geoprobe and tygon sample tubing.
(8). Soil analysis will be for PCE and TCE only.

		Estimated Annual Cost
I.	GROUNDWATER AND SURFACE WATER SAMPLING AND ANALYSIS	
A.	Sample Collection (64 MH @ $50/MH)	$3,200
B.	Sample Analysis (50 water samples, 3 analytes per sample, $135/sample)	$6,750
C.	Assemble and Analyze Data (48 MH @ $80/MH)	$3,840
D.	Report Development and Submittal (16 MH @ $80/MH)	$1,280
E.	Expenses	
	Travel/Mileage	$400
	Miscellaneous	$200

		Estimated Annual Cost
SOIL SAMPLING ANALYSIS		
A.	Sample Collection (2 days @ 10hr/day @ $85/hr)	$1,700
B.	Mobilization and Travel Time (32 MH @ $50/hr)	$1,600
C.	Expenses and Consumables	$1,600
D.	Sample Analysis (20 soil samples, 2 analytes per sample, $135/sample)	$2,700
E.	Assemble and Analyze Data (32 MH @ $80/MH)	$2,560
F.	Report Development and Submittal (16 MH @ $80/MH)	$1,280
	Estimated Operating Costs:	$27,100
	Contingencies (20%):	$5,420
	Total Estimated Operating Costs:	$32,520

ALTERNATIVE 2A: MONITORING; ICM
ESTIMATED ANNUAL OPERATING COSTS

PROJECT:	Amphenol Corp. / Franklin Power Products
PROJECT NUMBER:	07026.08

Costs presented are for semi-annual monitoring of select VOCs in groundwater, surface water, and soils for the Former Amphenol site, and operation of the interim control air stripper.
The following assumptions have been made:

(1). 17 existing groundwater monitoring wells and 3 new monitoring wells will require sampling.
(2). 5 surface water locations will require sampling.
(3). Sampling will be done on a semi-annual basis for a total of 12 years.
(4). Water samples will be analyzed for TCE, TCA, and PCE only.
(5). Soil samples will be obtained from 10 locations and at a depth of 18 to 24 feet at each location.
(6). Soil sample volume will be 125 ml.
(7). Soil samples will be obtained using a hydraulically driven geoprobe and tygon sample tubing.
(8). Soil analysis will be for PCE and TCE only.
(9). Air stripping system will operate continuously.
(10). No air monitoring will be required during stripper operation.

		Estimated Annual Cost
I.	GROUNDWATER AND SURFACE WATER SAMPLING AND ANALYSIS	
A.	Sample Collection (64 MH @ $50/MH)	$3,200
B.	Sample Analysis (50 water samples, 3 analytes per sample, $135/sample)	$6,750
C.	Assemble and Analyze Data (48 MH @ $80/MH)	$3,840
D.	Report Development and Submittal (16 MH @ $80/MH)	$1,280
E.	Expenses	
	Travel/Mileage	$400
	Miscellaneous	$200

		Estimated Annual Cost
.	SOIL SAMPLING ANALYSIS	
A.	Sample Collection (2 days @ 10hr/day @ $85/hr)	$1,700
B.	Mobilization and Travel Time (32 MH @ $50/hr)	$1,600
C.	Expenses and Consumables	$1,600
D.	Sample Analysis (20 soil samples, 2 analytes per sample, $135/sample)	$2,700
E.	Assemble and Analyze Data (32 MH @ $80/MH)	$2,560
F.	Report Development and Submittal (16 MH @ $80/MH)	$1,280
III.	AIR STRIPPING SYSTEM OPERATIONS	
A.	Electricity Costs (7.5 hp compressor, 5 hp blower, controls @ $0.06/KWH)	$6,800
B.	Quarterly Stripper Influent/Effluent Water Sampling and Analysis (2 samples/quarter @ $135/sample)	$1,080
C.	System Oversight (4 MH/wk @ $50/hr)	$10,400
D.	General Parts and Maintenance	$3,000
E.	Water Discharge to Sanitary Sewer (10gpm @ $2.81/1,000 gal.)	$14,800
	Estimated Operating Costs:	$63,200
	Contingencies (20%):	$12,640
	Total Estimated Operating Costs:	$75,840

ALTERNATIVE 3: MONITORING; ICM; AIR SPARGING AND SVE
ESTIMATED ANNUAL OPERATING COSTS

PROJECT:	Amphenol Corp. / Franklin Power Products
PROJECT NUMBER:	07026.08

Costs presented are for semi-annual monitoring of select VOCs in groundwater, surface water, and soils for the Former Amphenol site, operation of the interim control air stripper and an air sparging/SVE system. The following assumptions have been made:

(1). 17 existing groundwater monitoring wells and 3 new monitoring wells will require sampling.
(2). 5 surface water locations will require sampling.
(3). Sampling will be done on a semi-annual basis for a total of 12 years.
(4). Water samples will be analyzed for TCE, TCA, and PCE only.
(5). Soil samples will be obtained from 10 locations and at a depth of 18 to 24 feet at each location.
(6). Soil sample volume will be 125 ml.
(7). Soil samples will be obtained using a hydraulically driven geoprobe and tygon sample tubing.
(8). Soil analysis will be for PCE and TCE only.
(9). Air stripping system will operate continuously.
(10). Air sparging/SVE system will operate continuously.
(11). No air monitoring will be required during stripper or air sparging/SVE operation

			Estimated Annual Cost
I.	GROUNDWATER AND SURFACE WATER SAMPLING AND ANALYSIS		
	A.	Sample Collection (64 MH @ $50/MH)	$3,200
	B.	Sample Analysis (50 water samples, 3 analytes per sample, $135/sample)	$6,750
	C.	Assemble and Analyze Data (48 MH @ $80/MH)	$3,840
	D.	Report Development and Submittal (16 MH @ $80/MH)	$1,280
	E.	Expenses	
		Travel/Mileage	$400
		Miscellaneous	$200

			Estimated Annual Cost
.	SOIL SAMPLING ANALYSIS		
	A.	Sample Collection (2 days @ 10hr/day @ $85/hr)	$1,700
	B.	Mobilization and Travel Time (32 MH @ $50/hr)	$1,600
	C.	Expenses and Consumables	$1,600
	D.	Sample Analysis (20 soil samples, 2 analytes per sample, $135/sample)	$2,700
	E.	Assemble and Analyze Data (32 MH @ $80/MH)	$2,560
	F.	Report Development and Submittal (16 MH @ $80/MH)	$1,280
III.	AIR STRIPPING SYSTEM OPERATIONS		
	A.	Electricity Costs (7.5 hp compressor, 5 hp blower, controls @ $0.06/KWH)	$6,800
	B.	Quarterly Stripper Influent/Effluent Water Sampling and Analysis (2 samples/quarter @ $135/sample)	$1,080
	C.	System Oversight (4 MH/wk @ $50/hr)	$10,400
	D.	General Parts and Maintenance	$3,000
	E.	Water Discharge to Sanitary Sewer (10gpm @ $2.81/1,000 gal.)	$14,800
IV.	AIR SPARGING AND SVE SYSTEM OPERATIONS		
	A.	Electricity Costs (40 hp blower, 30 hp vacuum pump @ $0.06/KWH)	$18,600
	B.	System Oversight (4 MH/wk @ $50/hr)	$10,400
	C.	General Parts and Maintenance	$3,000
	D.	General Performance Monitoring	$2,000
		Estimated Operating Costs:	$97,200
		Contingencies (20%):	$19,440
		Total Estimated Operating Costs:	$116,640

ALTERNATIVE 4: MONITORING; ICM; SOIL EXCAVATION & AERATION
ESTIMATED ANNUAL OPERATING COSTS

PROJECT:	Amphenol Corp. / Franklin Power Products
PROJECT NUMBER:	07026.08

Costs presented are for semi-annual monitoring of select VOCs in groundwater, surface water, and soils for the Former Amphenol site, and operation of the interim control air stripper.
The following assumptions have been made:

(1). 17 existing groundwater monitoring wells and 3 new monitoring wells will require sampling.
(2). 5 surface water locations will require sampling.
(3). Sampling will be done on a semi-annual basis for a total of 12 years.
(4). Water samples will be analyzed for TCE, TCA, and PCE only.
(5). Soil samples will be obtained from 10 locations and at a depth of 18 to 24 feet at each location.
(6). Soil sample volume will be 125 ml.
(7). Soil samples will be obtained using a hydraulically driven geoprobe and tygon sample tubing.
(8). Soil analysis will be for PCE and TCE only.
(9). Air stripping system will operate continuously.
(10). No air monitoring will be required during stripper operation or soil aeration.

			Estimated Annual Cost
I.	GROUNDWATER AND SURFACE WATER SAMPLING AND ANALYSIS		
	A.	Sample Collection (64 MH @ $50/MH)	$3,200
	B.	Sample Analysis (50 water samples, 3 analytes per sample, $135/sample)	$6,750
	C.	Assemble and Analyze Data (48 MH @ $80/MH)	$3,840
	D.	Report Development and Submittal (16 MH @ $80/MH)	$1,280
	E.	Expenses	
		Travel/Mileage	$400
		Miscellaneous	$200

			Estimated Annual Cost
.	SOIL SAMPLING ANALYSIS		
	A.	Sample Collection (2 days @ 10hr/day @ $85/hr)	$1,700
	B.	Mobilization and Travel Time (32 MH @ $50/hr)	$1,600
	C.	Expenses and Consumables	$1,600
	D.	Sample Analysis (20 soil samples, 2 analytes per sample, $135/sample)	$2,700
	E.	Assemble and Analyze Data (32 MH @ $80/MH)	$2,560
	F.	Report Development and Submittal (16 MH @ $80/MH)	$1,280
III.	AIR STRIPPING SYSTEM OPERATIONS		
	A.	Electricity Costs (7.5 hp compressor, 5 hp blower, controls @ $0.06/KWH)	$6,800
	B.	Quarterly Stripper Influent/Effluent Water Sampling and Analysis (2 samples/quarter @ $135/sample)	$1,080
	C.	System Oversight (4 MH/wk @ $50/hr)	$10,400
	D.	General Parts and Maintenance	$3,000
	E.	Water Discharge to Sanitary Sewer (10gpm @ $2.81/1,000 gal.)	$14,800
		Estimated Operating Costs:	$63,200
		Contingencies (20%):	$12,640
		Total Estimated Operating Costs:	$75,840

ALTERNATIVE 4A: MONITORING; ICM; SOIL EXCAVATION & DISPOSAL
ESTIMATED ANNUAL OPERATING COSTS

PROJECT:	Amphenol Corp. / Franklin Power Products
PROJECT NUMBER:	07026.08

Costs presented are for semi-annual monitoring of select VOCs in groundwater, surface water, and soils for the Former Amphenol site, and operation of the interim control air stripper.
The following assumptions have been made:

(1). 17 existing groundwater monitoring wells and 3 new monitoring wells will require sampling.
(2). 5 surface water locations will require sampling.
(3). Sampling will be done on a semi-annual basis for a total of 12 years.
(4). Water samples will be analyzed for TCE, TCA, and PCE only.
(5). Soil samples will be obtained from 10 locations and at a depth of 18 to 24 feet at each location.
(6). Soil sample volume will be 125 ml.
(7). Soil samples will be obtained using a hydraulically driven geoprobe and tygon sample tubing.
(8). Soil analysis will be for PCE and TCE only.
(9). Air stripping system will operate continuously.
(10). No air monitoring will be required during stripper operation.

		Estimated Annual Cost
I.	GROUNDWATER AND SURFACE WATER SAMPLING AND ANALYSIS	
A.	Sample Collection (64 MH @ $50/MH)	$3,200
B.	Sample Analysis (50 water samples, 3 analytes per sample, $135/sample)	$6,750
C.	Assemble and Analyze Data (48 MH @ $80/MH)	$3,840
D.	Report Development and Submittal (16 MH @ $80/MH)	$1,280
E.	Expenses	
	Travel/Mileage	$400
	Miscellaneous	$200

			Estimated Annual Cost
	SOIL SAMPLING ANALYSIS		
	A.	Sample Collection (2 days @ 10hr/day @ $85/hr)	$1,700
	B.	Mobilization and Travel Time (32 MH @ $50/hr)	$1,600
	C.	Expenses and Consumables	$1,600
	D.	Sample Analysis (20 soil samples, 2 analytes per sample, $135/sample)	$2,700
	E.	Assemble and Analyze Data (32 MH @ $80/MH)	$2,560
	F.	Report Development and Submittal (16 MH @ $80/MH)	$1,280
III.	AIR STRIPPING SYSTEM OPERATIONS		
	A.	Electricity Costs (7.5 hp compressor, 5 hp blower, controls @ $0.06/KWH)	$6,800
	B.	Quarterly Stripper Influent/Effluent Water Sampling and Analysis (2 samples/quarter @ $135/sample)	$1,080
	C.	System Oversight (4 MH/wk @ $50/hr)	$10,400
	D.	General Parts and Maintenance	$3,000
	E.	Water Discharge to Sanitary Sewer (10gpm @ $2.81/1,000 gal.)	$14,800
		Estimated Operating Costs:	$63,200
		Contingencies (20%):	$12,640
		Total Estimated Operating Costs:	$75,840

ALTERNATIVE 5: MONITORING; ICM; FOCUSED AIR SPARGING AND SVE ESTIMATED ANNUAL OPERATING COSTS

PROJECT:	Amphenol Corp. / Franklin Power Products
PROJECT NUMBER:	07026.08

Costs presented are for semi-annual monitoring of select VOCs in groundwater, surface water, and soils for the Former Amphenol site, and operation of the interim control air stripper.
The following assumptions have been made:

(1). 17 existing groundwater monitoring wells and 3 new monitoring wells will require sampling.
(2). 5 surface water locations will require sampling.
(3). Sampling will be done on a semi-annual basis for a total of 12 years.
(4). Water samples will be analyzed for TCE, TCA, and PCE only.
(5). Soil samples will be obtained from 10 locations and at a depth of 18 to 24 feet at each location.
(6). Soil sample volume will be 125 ml.
(7). Soil samples will be obtained using a hydraulically driven geoprobe and tygon sample tubing.
(8). Soil analysis will be for PCE and TCE only.
(9). Air stripping system will operate continuously.
(10). Air sparging/SVE system will operate continuously.
(11). No air monitoring will be required during stripper or air sparging/SVE operation.

		Estimated Annual Cost
I.	GROUNDWATER AND SURFACE WATER SAMPLING AND ANALYSIS	
A.	Sample Collection (64 MH @ $50/MH)	$3,200
B.	Sample Analysis (50 water samples, 3 analytes per sample, $135/sample)	$6,750
C.	Assemble and Analyze Data (48 MH @ $80/MH)	$3,840
D.	Report Development and Submittal (16 MH @ $80/MH)	$1,280
E.	Expenses	
	Travel/Mileage	$400
	Miscellaneous	$200

			Estimated Annual Cost
.	SOIL SAMPLING ANALYSIS		
	A.	Sample Collection (2 days @ 10hr/day @ $85/hr)	$1,700
	B.	Mobilization and Travel Time (32 MH @ $50/hr)	$1,600
	C.	Expenses and Consumables	$1,600
	D.	Sample Analysis (20 soil samples, 2 analytes per sample, $135/sample)	$2,700
	E.	Assemble and Analyze Data (32 MH @ $80/MH)	$2,560
	F.	Report Development and Submittal (16 MH @ $80/MH)	$1,280
III.	AIR STRIPPING SYSTEM OPERATIONS		
	A.	Electricity Costs (7.5 hp compressor, 5 hp blower, controls @ $0.06/KWH)	$6,800
	B.	Quarterly Stripper Influent/Effluent Water Sampling and Analysis (2 samples/quarter @ $135/sample)	$1,080
	C.	System Oversight (4 MH/wk @ $50/hr)	$10,400
	D.	General Parts and Maintenance	$3,000
	E.	Water Discharge to Sanitary Sewer (10gpm @ $2.81/1,000 gal.)	$14,800
IV.	AIR SPARGING AND SVE SYSTEM OPERATIONS		
	A.	Electricity Costs (20 hp blower, 25 hp vacuum pump @ $0.06/KWH)	$13,800
	B.	System Oversight (4 MH/wk @ $50/hr)	$10,400
	C.	General Parts and Maintenance	$3,000
	D.	General Performance Monitoring	$2,000
		Estimated Operating Costs:	$92,400
		Contingencies (20%):	$18,480
		Total Estimated Operating Costs:	$110,880

ALTERNATIVE 6: MONITORING; ICM CARBON ADSORPTION; REINJECTION
ESTIMATED ANNUAL OPERATING COSTS

PROJECT:	Amphenol Corp. / Franklin Power Products
PROJECT NUMBER:	07026.08

Costs presented are for semi-annual monitoring of select VOCs in groundwater, surface water, and soils for the Former Amphenol site, and operation of the interim control air stripper.
The following assumptions have been made:

(1). 17 existing groundwater monitoring wells and 3 new monitoring wells will require sampling.
(2). 5 surface water locations will require sampling.
(3). Sampling will be done on a semi-annual basis for a total of 12 years.
(4). Water samples will be analyzed for TCE, TCA, and PCE only.
(5). Soil samples will be obtained from 10 locations and at a depth of 18 to 24 feet at each location.
(6). Soil sample volume will be 125 ml.
(7). Soil samples will be obtained using a hydraulically driven geoprobe and tygon sample tubing.
(8). Soil analysis will be for PCE and TCE only.
(9). Air stripping system will operate continuously.
(10). Carbon system will require change-out once per year.
(11). No air monitoring will be required during stripper operation.

		Estimated Annual Cost
I.	GROUNDWATER AND SURFACE WATER SAMPLING AND ANALYSIS	
A.	Sample Collection (64 MH @ $50/MH)	$3,200
B.	Sample Analysis (50 water samples, 3 analytes per sample, $135/sample)	$6,750
C.	Assemble and Analyze Data (48 MH @ $80/MH)	$3,840
D.	Report Development and Submittal (16 MH @ $80/MH)	$1,280
E.	Expenses	
	Travel/Mileage	$400
	Miscellaneous	$200

		Estimated Annual Cost
	SOIL SAMPLING ANALYSIS	
A.	Sample Collection (2 days @ 10hr/day @ $85/hr)	$1,700
B.	Mobilization and Travel Time (32 MH @ $50/hr)	$1,600
C.	Expenses and Consumables	$1,600
D.	Sample Analysis (20 soil samples, 2 analytes per sample, $135/sample)	$2,700
E.	Assemble and Analyze Data (32 MH @ $80/MH)	$2,560
F.	Report Development and Submittal (16 MH @ $80/MH)	$1,280
III.	AIR STRIPPING/ ADSORPTION/ REINJECTION SYSTEM OPERATIONS	
A.	Electricity Costs (7.5 hp compressor, 5 hp blower, 2 HP reinjection pump, controls @ $0.06/KWH)	$7,950
B.	Quarterly Stripper Influent/Effluent Water Sampling and Analysis (2 samples/quarter @ $135/sample)	$1,080
C.	Bi-Weekly Mid-Carbon/Carbon Effluent Water Sampling and Analysis (4 samples/month @ $135/sample)	$6,480
D.	System Oversight (6 MH/wk @ $50/hr)	$15,600
E.	General Parts and Maintenance	$5,000
F.	Carbon Change and Disposal (800 lb carbon @ $1.80/lb)	$1,440
G.	Water Discharge to Sanitary Sewer (2 gpm @ $2.81/1,000 gal.)	$3,000
H.	General Performance Monitoring	$2,000
	Estimated Operating Costs:	$69,700
	Contingencies (20%):	$13,940
	Total Estimated Operating Costs:	$83,640

Carbon Monoxide; Ozone; and Nitrogen Dioxides

Cited in: 326 IAC 2-1-1; 326 IAC 2-1-3; 326 IAC 2-2-1; 326 IAC 2-2-2; 326 IAC 2-3-2; 326 IAC 5-1-1; 326 IAC 6-2-1.

326 IAC 1-4-1 Designations

Authority: IC 13-1-1-4; IC 13-7-7
Affected: IC 13-1-1-1; IC 13-1-1-4; IC 13-7-1-1; IC 13-7-7

Sec. 1. (a) The air pollution control board incorporates by reference 40 CFR 81.315 and 56 FR 56694 concerning attainment status designations.

(b) Copies of the Code of Federal Regulations (CFR) and the Federal Register (FR) referenced in this article may be obtained from the Government Printing Office, Washington, D.C. 20402. Also, copies of the CFR and the FR are available from the Indiana Department of Environmental Management, Office of Air Management, 105 South Meridian Street, Indianapolis, Indiana 46225. *(Air Pollution Control Board; 326 IAC 1-4-1; filed Mar 10, 1988, 1:20 p.m.: 11 IR 2379; filed Aug 9, 1991, 11:00 a.m.: 14 IR 2218; filed Dec 30, 1992, 9:00 a.m.: 16 IR 1382)*

Rule 6. Malfunctions

Cited in: 326 IAC 1-6-1; 326 IAC 1-6-2; 326 IAC 2-7-16; 326 IAC 2-8-12; 326 IAC 11-5-6.

326 IAC 1-6-1 Applicability of rule

Authority: IC 13-1-1-4; IC 13-7-7-1
Affected: IC 13-1-1

Sec. 1. The requirements of this rule shall apply to the owner or operator of any facility required to obtain a permit under 326 IAC 2-1-2 and 326 IAC 2-1-4. *(Air Pollution Control Board; 326 IAC 1-6-1; filed Mar 10, 1988, 1:20 p.m.: 11 IR 2380; filed May 25, 1994, 11:00 a.m.: 17 IR 2238)*

Cited in: 326 IAC 1-6-3; 326 IAC 1-6-6.

326 IAC 1-6-3 Preventive maintenance plans

Cited in: 326 IAC 2-7-4; 326 IAC 2-8-3.

ARTICLE 2. PERMIT REVIEW RULES

Cited in: 326 IAC 1-7-4; 326 IAC 2-1-7.1; 326 IAC 2-1-12; 326 IAC 2-2-3; 326 IAC 2-7-12; 326 IAC 2-8-11; 326 IAC 3-1.1-1; 326 IAC 4-2-2; 326 IAC 6-1-2; 326 IAC 6-2-1; 326 IAC 6-5-1; 326 IAC 6-5-8; 326 IAC 7-1.1-1; 326 IAC 7-1.1-2; 326 IAC 7-4-1.1; 326 IAC 7-4-8; 326 IAC 7-4-14; 326 IAC 8-1-1; 326 IAC 11-3-1.

Rule 1. Construction and Operating Permit Requirements

Cited in: 326 IAC 1-2-42; 326 IAC 2-1-1; 326 IAC 2-1-3; 326 IAC 2-1-3.2; 326 IAC 2-1-5; 326 IAC 2-1-9; 326 IAC 2-1-11.1; 326 IAC 2-1-13; 326 IAC 2-3-1; 326 IAC 2-3-3; 326 IAC 2-5-1; 326 IAC 2-7-2; 326 IAC 2-7-8; 326 IAC 2-8-7; 326 IAC 2-8-11; 326 IAC 2-9-1; 326 IAC 6-1-11.1.

326 IAC 2-1-1 Applicability of rule

Authority: IC 13-1-1-4; IC 13-7-7-1
Affected: IC 13-1-1; 13-7

Sec. 1. (a) This rule applies to the following:

(1) Any person currently operating or proposing to operate any source, as defined in 326 IAC 1-2-73, or facility, as defined in 326 IAC 1-2-27, which has allowable emissions of any regulated pollutant equal to or greater than any amount specified in either subsection (b)(1) or (b)(2).

(2) Any person proposing to begin, after the promulgation date of this rule, construction or modification of any source or facility or any person currently constructing or modifying any source or facility which has allowable emissions of any regulated pollutant equal to or greater than any amount specified in either subsection (b)(1) or (b)(2).

(3) Any person proposing a modification in Lake or Porter County that would increase either of the following emissions:

(A) Volatile organic compounds by fifteen (15) pounds or more per day from any existing source that emits or has the potential to emit, as defined by 326 IAC 2-3-1(v), twenty-five (25) tons per year or more of volatile organic compounds.

(B) Oxides of nitrogen by twenty-five (25) pounds or more per day from any existing source that emits or has the potential to emit, as defined by 326 IAC 2-3-1(v), twenty-five (25) tons per year or more of oxides of nitrogen.

(4) Any person proposing to construct or operate any grain terminal elevator as defined in 326 IAC 1-2-33.2.

(5) The commissioner shall also reserve the right to require sources or facilities which have allowable emissions of any pollutant (excluding single-resident dwellings) to complete a permit application and to obtain a construction or operating permit prior to constructing or operating the source or facility.

(b) Any person owning or operating any source, facility, or modification described in subsection (a) shall request and complete a permit application provided by the commissioner. Upon review of the application by the commissioner, the source or facility shall be permitted, registered, denied, or exempted as follows:

(1) Sources, facilities, or modifications meeting the following requirements shall be permitted according to sections 3, 3.2, 4, and 7.1 of this rule except where otherwise noted:

(A) Sources, facilities, or modifications with allowable emissions of twenty-five (25) tons or more per year of any regulated pollutant.

(B) The following types of sources, facilities, or modifications with allowable emissions of one (1) ton or more per year of lead or lead compounds measured as elemental lead:

(i) Primary lead smelters.

(ii) Secondary lead smelters.

(iii) Primary copper smelters.

(iv) Lead gasoline additive plants.

(v) Lead-acid storage battery manufacturing plants that produce two thousand (2,000) or more batteries per day.

(C) Any other stationary source with allowable emissions of five (5) tons or more per year of lead or lead compounds measured as elemental lead.

(D) Any modification which will increase allowable emissions of lead by more than six-tenths (0.6) tons *[sic., ton]* per year of lead from any existing source that currently has allowable emissions of more than five (5) tons per year of lead.

(E) Any modification to an existing source that emits or has allowable emissions of twenty-five (25) tons per year or more of volatile organic compounds (VOC) or oxides of nitrogen (NO$_x$) in Lake or Porter County that causes an emissions increase of VOC or NO$_x$ subject to 326 IAC 2-3-2(b)(2) or 326 IAC 2-3-2(b)(3).

(F) Any modification which will increase allowable emissions of particulate matter with an aerodynamic diameter less than or equal to ten (10) micrometers (PM$_{10}$) by fifteen (15) tons per year.

(G) Any source or facility with allowable emissions, in the aggregate, of ten (10) tons per year of any hazardous air pollutant or twenty-five (25) tons per year of any combination of hazardous air pollutants, as defined in 326 IAC 1-2-33.5.

(H) After the date that approval by U.S. EPA of the Indiana Part 70 permit program becomes effective, any modification of a major source of hazardous air pollutants which will increase allowable emissions of any one (1) hazardous air pollutant by four (4) tons per year or any combination of hazardous air pollutants by ten (10) tons per year. This requirement does not apply if the owner or operator demonstrates with a written submission that the sum of the emissions increases and decreases of any single hazardous air pollutant from the modification does not exceed four (4) tons per year.

(2) The following sources, facilities, or modifications shall be registered in accordance with section 2 of this rule:

(A) Facilities or sources:

(i) currently operating, or proposed to be operated, constructed, or modified; and

(ii) which would have allowable emissions of any regulated pollutant less than twenty-five (25) tons per year and greater than the following amounts:

(AA) Particulate matter in excess of either five (5) pounds per hour or twenty-five (25) pounds per day.

(BB) Sulfur dioxide in excess of either ten (10) pounds per hour or fifty (50) pounds per day.

(CC) Nitrogen oxides in excess of either five (5) pounds per hour or twenty-five (25) pounds per day.

(DD) Volatile organic compounds in excess of either three (3) pounds per hour or fifteen (15) pounds per day as calculated in accordance with 326 IAC 1-2-2(6).

(EE) Carbon monoxide in excess of either twenty-five (25) pounds per hour or one hundred twenty-five (125) pounds per day as calculated in accordance with 326 IAC 1-2-2(6).

(B) Modifications to existing sources that emit or have the potential to emit as defined in 326 IAC 2-3-1(v), twenty-five (25) tons per year or more of volatile organic compounds (VOC) or oxides of nitrogen (NO$_x$) in Lake or Porter County which are not required to obtain a construction permit under subdivision (1), but would result in a potential emissions increase of fifteen (15) pounds of VOC per day or twenty-five (25) pounds of NO$_x$ per day and fall under 326 IAC 2-3-2(b)(1).

(3) The following source, facility, or modification shall not be subject to the requirements of this rule:

(A) Sources that are currently operating, or are proposed to be operated, constructed, or modified, and which would have allowable emissions of less than the amounts specified in either subdivision (1) or (2).

(B) Modifications at an existing source that consist only of changes in a method of operation, a reconfiguration of existing equipment or other minor physical changes, or a combination thereof, and which do not result in an increase in emissions that:

(i) exceeds the significance levels established in 326 IAC 2-2-1 when subject only to specific emission limits contained in this title;

(ii) exceeds the significance levels established in 326 IAC 2-3-1 when subject only to specific emission limits contained in this title;

(iii) is subject to the provisions of section 3.3 of this rule;

(iv) exceeds the emissions levels established in subsection (a)(3) of this rule;

(v) exceeds any of the emission levels established in subsection (b)(1)(B) through (b)(1)(H) *[subdivision (1)(B) through (1)(H)]*; or

(vi) is subject to the provisions of 326 IAC 8-1-6, if the modification is to equipment installed after January 1, 1980, that has not previously been subject to review in accordance with 326 IAC 8-1-6.

(C) Temporary operations and experimental trials that involve construction, reconstruction, or modification and that meet the following criteria:

(i) The potential emissions from the construction or reconstruction of a facility or source or the potential emissions increase from the modification are less than twenty-five (25) tons for the duration of the operation.

(ii) The construction, reconstruction, or modification are not major sources or modifications as defined by 326 IAC 2-2, 326 IAC 2-3, or 326 IAC 2-7.

(iii) The purpose of the construction, reconstruction, or modification is to:

(AA) collect data for experimental purposes, including, but not limited to, process improvements, new product development, and pollution prevention; or

(BB) temporarily conduct an operation not considered part of the normal operation or production of the facility or source.

(iv) The duration of the temporary operation or experimental trial is less than thirty (30) days of total operating time.

(v) If the construction, reconstruction, or modification is part of a soil or water remediation project, the duration of the project is less than twenty-four (24) hours or a greater period, not to exceed seventy-two (72) hours, as determined to be necessary by the department considering the nature of the project or the manner of testing, and the purpose of the project is to identify parameters necessary to design the remediation effort.

(vi) If the construction, reconstruction, or modification would otherwise require a registration or construction permit, the owner or operator shall provide the commissioner written notice of the proposed construction, reconstruction, or modification at least seven (7) days before beginning the construction, reconstruction, or modification. The notice shall contain the following information:

(AA) A description of the purpose of the construction, reconstruction, or modification.

(BB) A description of how the construction, reconstruction, or modification is experimental or not part of the normal operation or production of the facility or source.

(CC) The dates the owner or operator anticipates the construction, reconstruction, or modification to begin, operations to begin, and operations to cease.

(DD) An estimate of the potential emissions and actual emissions increase resulting from the construction or reconstruction.

(EE) The equipment involved in the construction, reconstruction, or modification.

(vii) If the construction, reconstruction, or modification would otherwise require a registration or construction permit, the owner or operator shall provide the commissioner written notice of the proposed construction, reconstruction, or modification at most seven (7) days after concluding the temporary operation or experimental trial. The notice shall contain the following information:

(AA) The actual start date of the construction, reconstruction, or modification.

(BB) The duration of the temporary operation or experimental trial.

(CC) The actual emissions occurring during the temporary operation or experimental trial.

(viii) The exemption provided by this subsection shall not apply to facilities or sources whose operations are experimental in nature, part of pilot plants, or characterized by frequent product changes.

(4) Sources that have entered into an enforceable operating agreement under 326 IAC 2-9 shall not be subject to section 4 of this rule.

(c) Facilities or sources required to be permitted in accordance with this rule shall comply with the following provisions:

(1) Facilities or sources which are currently located in, are proposing to be located in, or which may impact upon any attainment or unclassifiable area as designated in 326 IAC 1-4, shall comply with all applicable provisions of 326 IAC 2-2 in addition to the applicable requirements of this rule.

(2) Facilities or sources which are located in, which may impact upon, or which are proposing to locate in any nonattainment area that is designated in 326 IAC 1-4, shall comply with all applicable provisions of 326 IAC 2-3 in addition to all applicable provisions of this rule.

(Air Pollution Control Board; 326 IAC 2-1-1; filed Mar 10, 1988, 1:20 p.m.: 11 IR 2384; filed Nov 12, 1993, 4:00 p.m.: 17 IR 721; filed May 25, 1994, 11:00 a.m.: 17 IR 2238; errata filed May 25, 1994, 11:10 a.m.: 17 IR 2358)

Cited In: 326 IAC 1-2-42; 326 IAC 2-1-2, 326 IAC 2-1-3; 326 IAC 2-1-4; 326 IAC 2-7-1; 326 IAC 2-7-12; 326 IAC 2-8-11.

326 IAC 2-1-2 Registration

Authority: IC 13-1-1-4; IC 13-7-7-1
Affected: IC 13-1-1; IC 13-7

Sec. 2. (a) No person subject to section 1(b)(2) of this ruleshall commence construction, operation, or modification of any source or facility without registering the same with the commissioner.

(b) The registrant shall submit the following information to the commissioner:

(1) A description of the nature, location, design capacity, and operating schedule of the source or facility, including the design specifications.

(2) A time schedule for construction or modification of the source or facility.

(3) Information on the nature and amount of pollutants to be emitted and any other information determined by the commissioner as necessary to demonstrate compliance with the ambient air quality standards.

(c) Upon receipt of the information requested, the commissioner shall make a final determination within the time period described under 326 IAC 2-5.

(d) As a condition to accepting a source or facility registration, the commissioner may impose emission limitations on operating conditions for the registration if necessary to maintain the ambient air quality standards or otherwise protect the public health.

(e) The commissioner shall include in any registration a physical description of the facilities and operating information consistent with the application and thresholds for registration under section 1(b)(2) of this rule. *(Air Pollution Control Board; 326 IAC 2-1-2; filed Mar 10, 1988, 1:20 p.m.: 11 IR 2385; filed Nov 12, 1993, 4:00 p.m.: 17 IR 723; filed May 25, 1994, 11:00 a.m.: 17 IR 2241)*

Cited In: 326 IAC 1-6-1; 326 IAC 2-1-1; 326 IAC 2-1-3.1; 326 IAC 2-1-7.1; 326 IAC 2-5-2; 326 IAC 2-7-12; 326 IAC 2-8-11.

326 IAC 2-1-3 Construction permits

Authority: IC 13-1-1-4; IC 13-7-7-1
Affected: IC 13-1-1; IC 13-7-10-1.1; IC 13-7-10-2.5; IC 13-7-16-7

Sec. 3. (a) No person required by section 1(b)(1) of this ruleto comply with this section shall commence construction or modification of any source or facility without first applying for and obtaining a construction permit from the commissioner.

(b) No construction permit shall be issued to any person for construction or modification of any source or facility if the commissioner determines that the source or facility will emit any air pollutant regulated under the Clean Air Act in amounts which will:

(1) interfere with attainment or maintenance of any ambient air quality standard set forth in 326 IAC 1-3; or

(2) interfere with attainment or maintenance of either the prevention of significant deterioration standards under 326 IAC 2-2 or the prevention of significant deterioration standards established by any adjoining state.

(c) Any person proposing the construction or modification of a major stationary PSD source or major PSD modification as defined under 326 IAC 2-2, which is or which will be located in an attainment area or unclassified area under 326 IAC 1-4, shall comply with the requirements of 326 IAC 2-2 in addition to the applicable requirements of this rule.

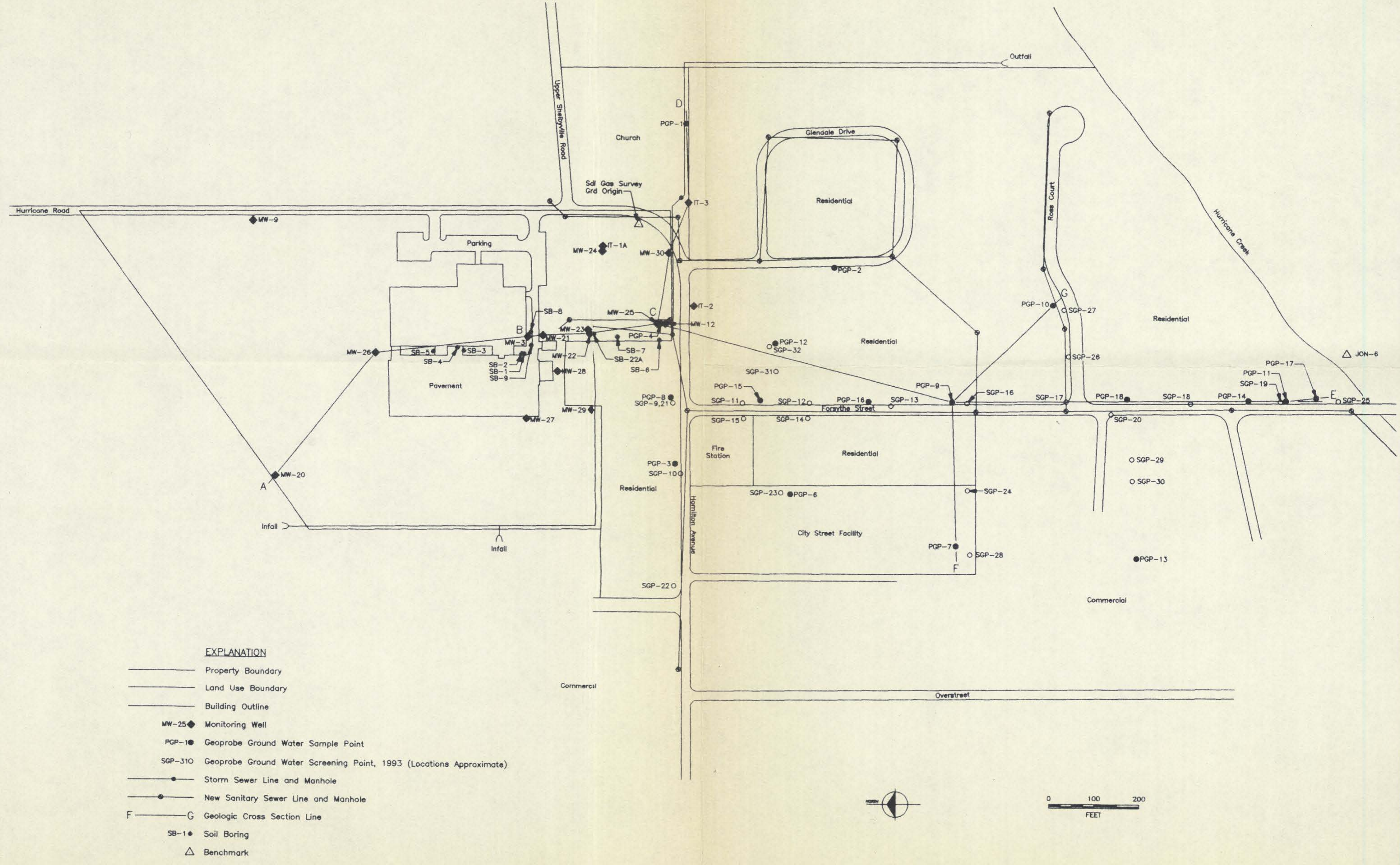
(d) Any person proposing the construction or modification of a major source or facility as defined under 326 IAC 2-3, which will significantly impact upon the air quality of a nonattainment area or which will be located in a nonattainment area under 326 IAC 1-4, shall comply with the requirements of 326 IAC 2-3 in addition to the applicable requirements of this rule.

(e) The applicant shall submit the following information in the permit application:

(1) A description of the nature, location, design capacity, and typical operating schedule of the proposed source or facility and any emission control equipment, including design specifications.

(2) A schedule for construction or modification of the source or facility.

(3) Information on the nature and amount of the pollutant to be emitted, estimates of offset credits as required under 326 IAC 2-3, for sources or facilities to be constructed or mod-



WW Engineering & Science
A Summit Company
5010 Stone Mill Road • Bloomington, IN 47408 • (812) 336-0972

NO.	DATE	BY	REVISIONS	BY	DATE
			REVISED IN ACCORDANCE WITH CONSTRUCTION RECORDS		

CURTIS-FRANKLIN
FRANKLIN, INDIANA
FORMER AMPHENOL RFI/CMS

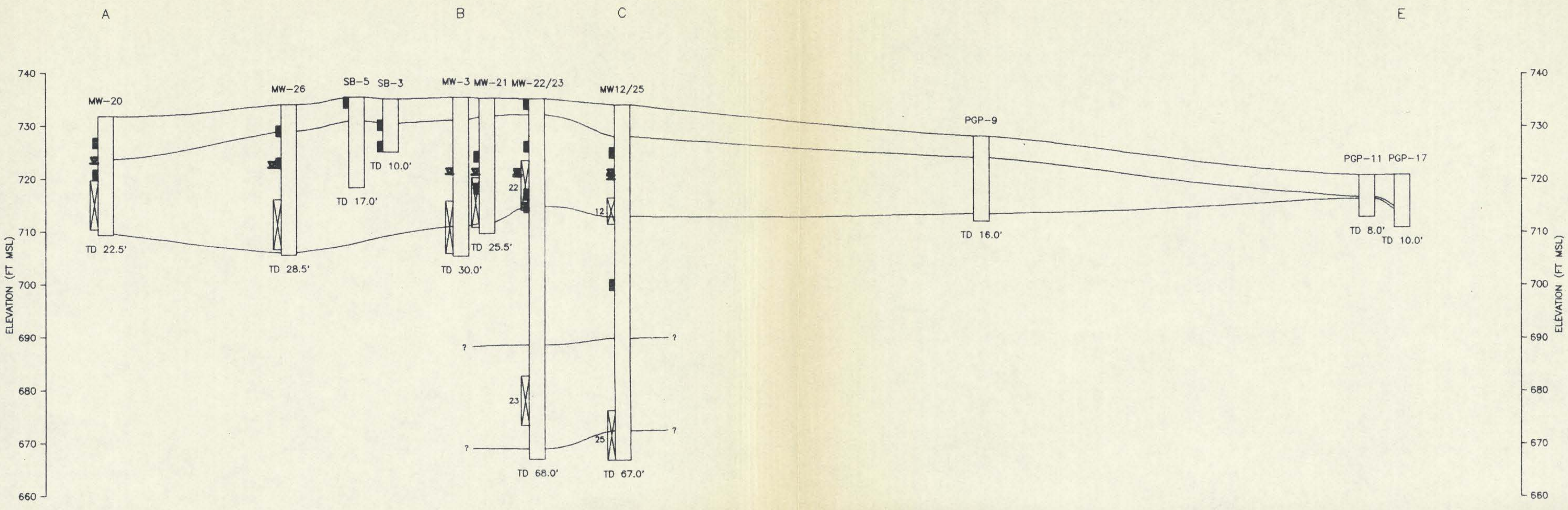
SITE MAP

DESIGNED BY JDS	DATE 04-26-93
DRAWN BY NW	DATE 04-26-93
CHECKED BY	DATE
FILE 7026SH3	EDIT NW060294
SCALE	1"=100' DRAWING
	1:100 PLOT

PROJECT 07026.00

3

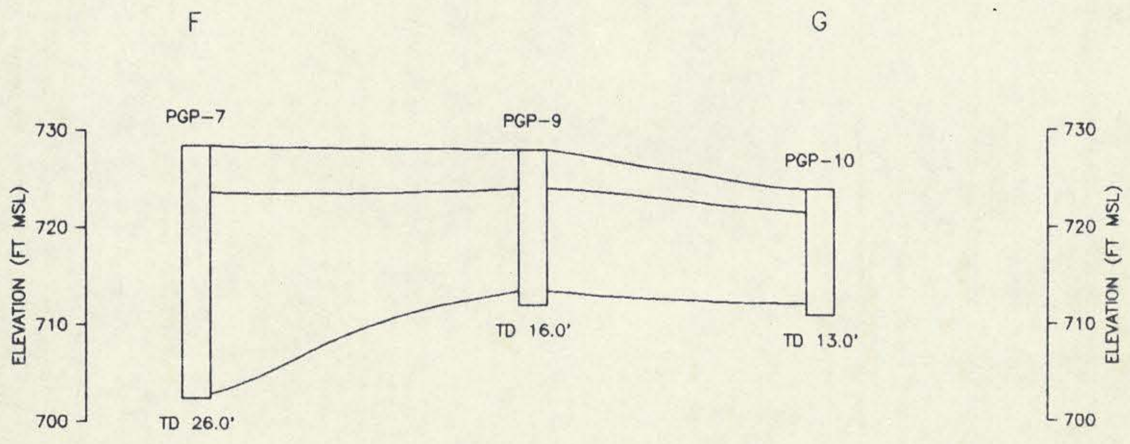
SHEET NO.



0 100 200 FEET

HORIZONTAL SCALE

10X VERTICAL EXAGGERATION



EXPLANATION

☒ Screened Interval

■ Soil Sample

⧗ Ground Water Elevation in Ft MSL, February 16, 1993

Lines of Section Shown on Sheet 3

WW Engineering & Science
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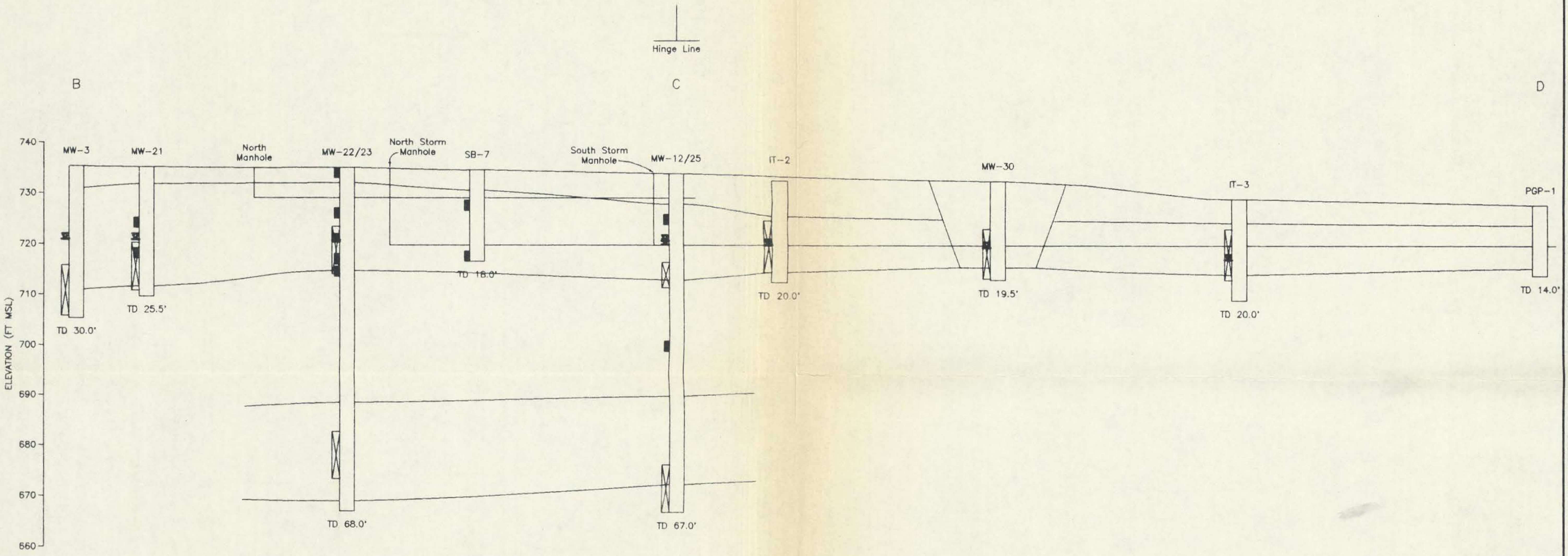
REVISIONS
NO | DATE | BY
REVISED IN ACCORDANCE WITH CONSTRUCTION RECORDS

CURTIS–FRANKLIN
FRANKLIN, INDIANA
FORMER AMPHENOL RFI/CMS
CROSS SECTIONS A–B–C–E & F–G

DESIGNED BY NW	DATE 04-22-93
DRAWN BY NW	DATE 04-22-93
CHECKED BY	DATE
FILE 7026SH4A	EDIT NWD60294
SCALE	1"=100' HORIZONTAL 1"=10' VERTICAL
PROJECT	07026.00

4A
SHEET NO.



0 25 50 feet

HORIZONTAL SCALE

2.5X VERTICAL EXAGGERATION

EXPLANATION

☒ Screened Interval

▮ Soil Sample

720.88 ▼ Ground Water Elevation in Ft MSL, February 16, 1993

——— Storm Sewer

——— New Sanitary Sewer

Line of Section Shown on Sheet 3

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REVISIONS
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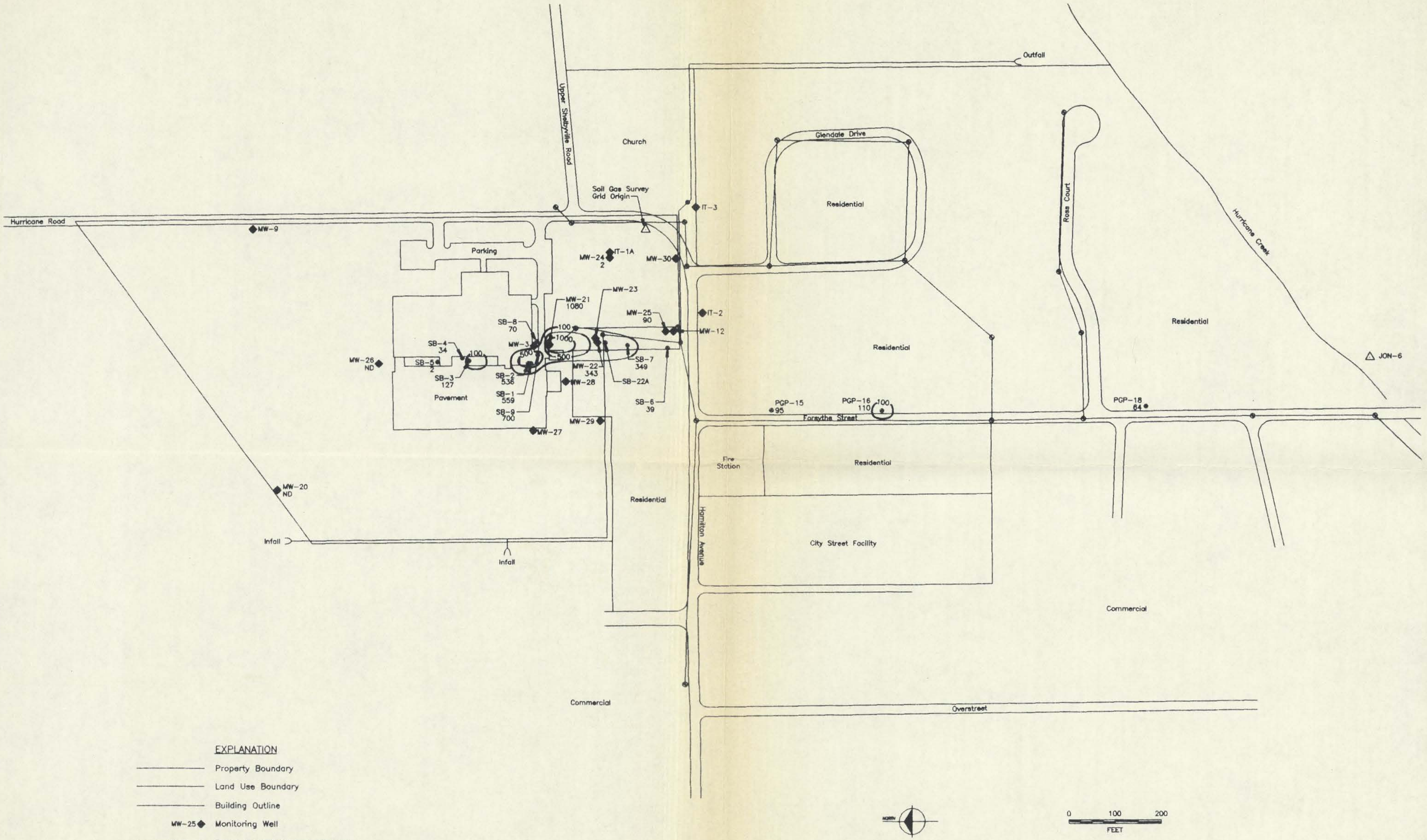
CURTIS-FRANKLIN
FRANKLIN, INDIANA
FORMER AMPHENOL RFI/CMS

CROSS SECTION B-C-D

DESIGNED BY NW	DATE 04-22-93
DRAWN BY NW	DATE 04-22-93
CHECKED BY	DATE
FILE 7026SH4B	EDIT NW042293
SCALE	1"=25' HORIZONTAL 1"=10' VERTICAL
PROJECT	07026.00

4B

SHEET NO.



EXPLANATION

——	Property Boundary
——	Land Use Boundary
——	Building Outline
MW-25◆	Monitoring Well
——•——	Storm Sewer Line and Manhole
——⊕——	New Sanitary Sewer Line and Manhole
SB-1●	Soil Boring
——100——	Total VOC Concentration Contour (ug/Kg) (DCA+PCE+TCA+TCE)
536	Total VOC Concentration in Soil Samples Collected from 0-12 Feet (ug/Kg) (DCA+PCE+TCA+TCE)
ND	No VOC Reported Above Detection Limits (See Table 8)
△	Benchmark

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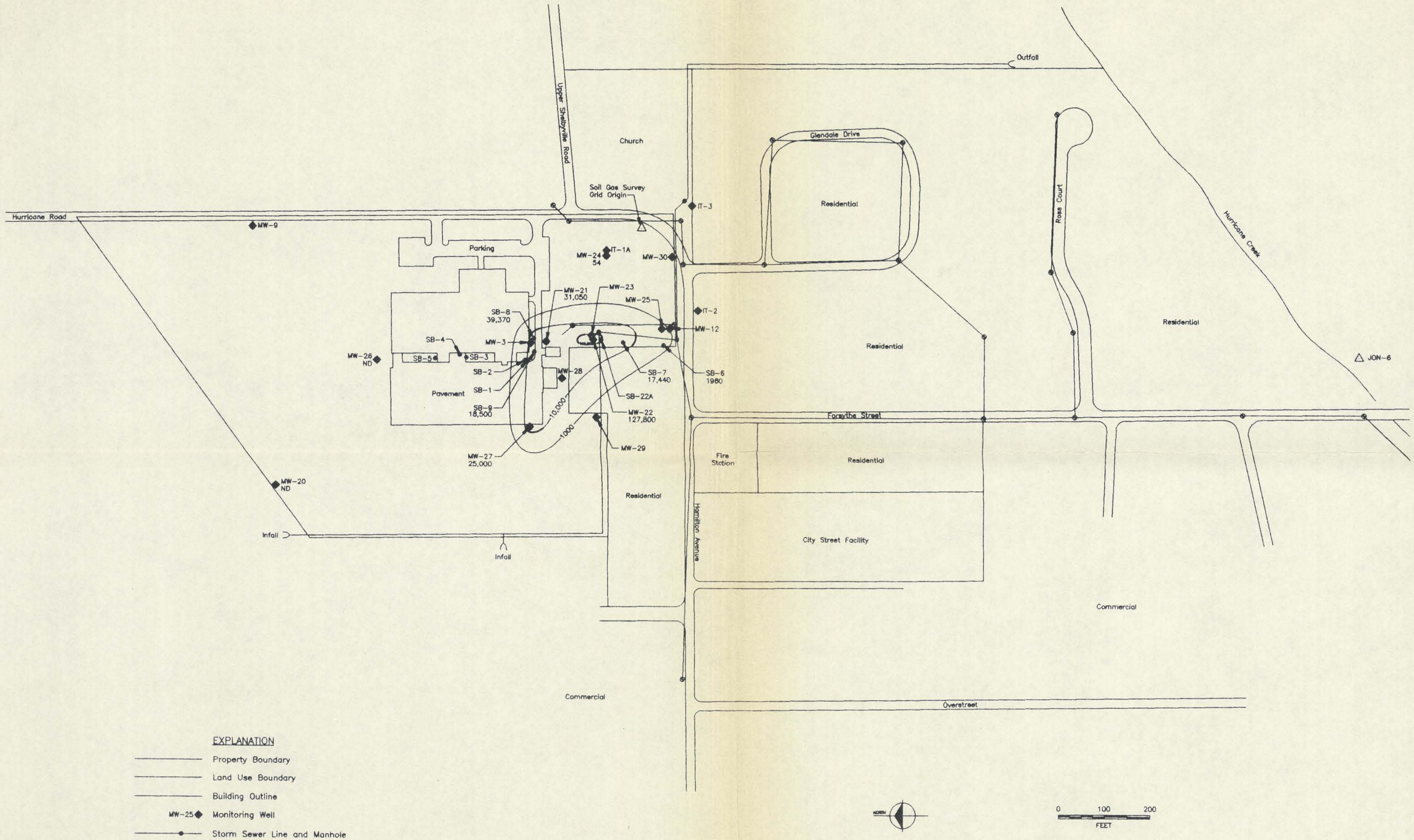
FORMER AMPHENOL RFI/CMS
TOTAL VOCs IN SOIL SAMPLES
≤12 FEET DEEP

DESIGNED BY JDB	DATE 10-06-93
DRAWN BY NW	DATE 10-06-93
CHECKED BY	DATE
FILE 7028SH5A	EDIT NW011196
SCALE	1"=100'
	DRAWING 1:100
	PLOT

PROJECT 07028.00

5A
SHEET NO.



EXPLANATION

	Property Boundary
	Land Use Boundary
	Building Outline
MW-25◆	Monitoring Well
	Storm Sewer Line and Manhole
	New Sanitary Sewer Line and Manhole
SB-1●	Soil Boring
100	Total VOC Concentration Contour (ug/Kg) (DCA+PCE+TCA+TCE)
18,500	Total VOC Concentration in Soil Samples Collected Below 12 Feet (ug/Kg) (DCA+PCE+TCA+TCE)
ND	No VOC Reported Above Detection Limits (See Table 8)
△	Benchmark

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REVISIONS
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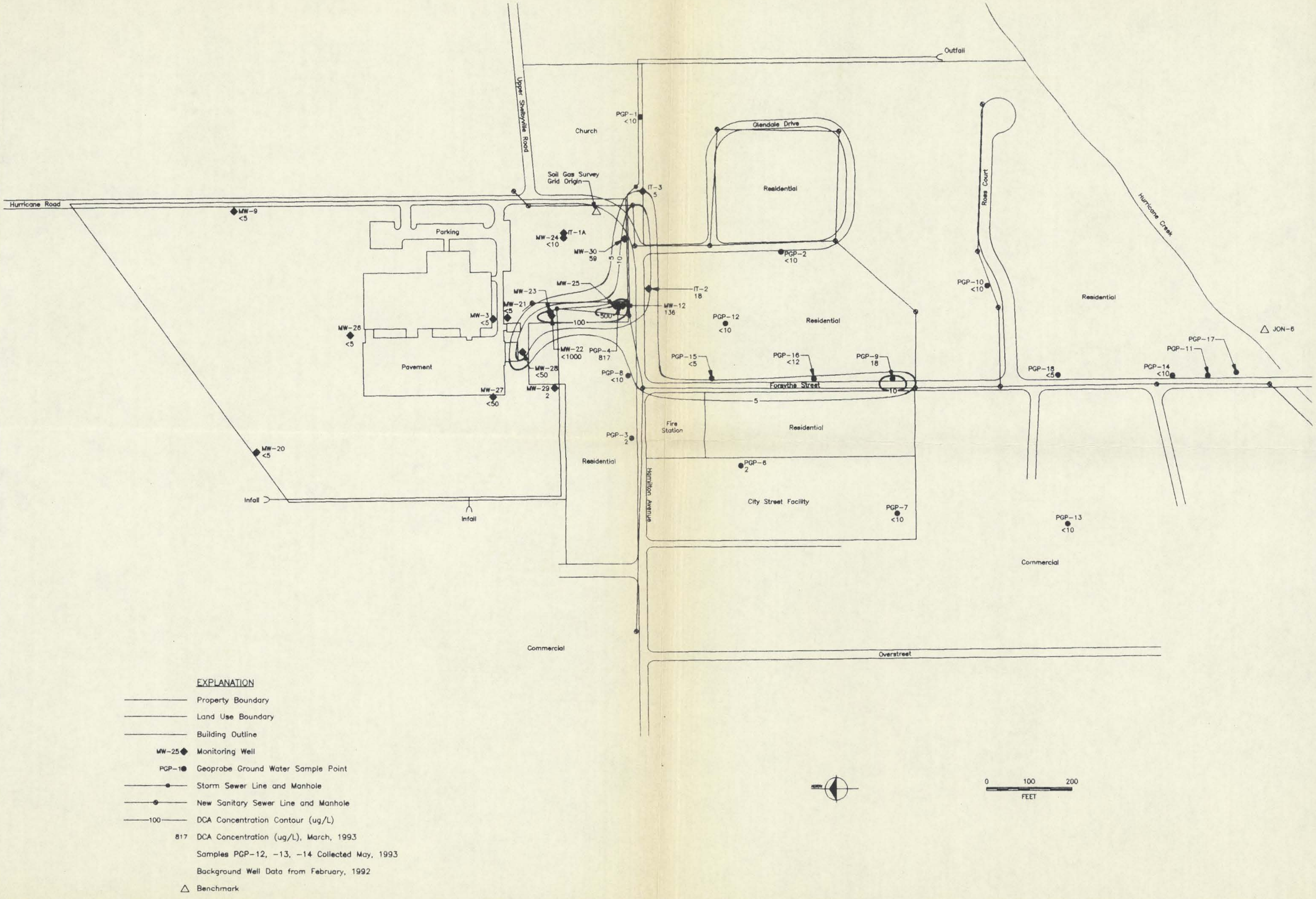
CURTIS-FRANKLIN
FRANKLIN, INDIANA
FORMER AMPHENOL RFI/CMS
TOTAL VOCs IN SOIL SAMPLES
>12 FEET DEEP

DESIGNED BY JDB	DATE 10-06-93
DRAWN BY NW	DATE 10-06-93
CHECKED BY	DATE
FILE 7026SH5B	EDIT NW061394
SCALE	1"=100' DRAWING 1:100 PLOT
PROJECT	07026.00

5B
SHEET NO.



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NO	REVISIONS	BY	DATE

NO	REVISIONS	BY	DATE

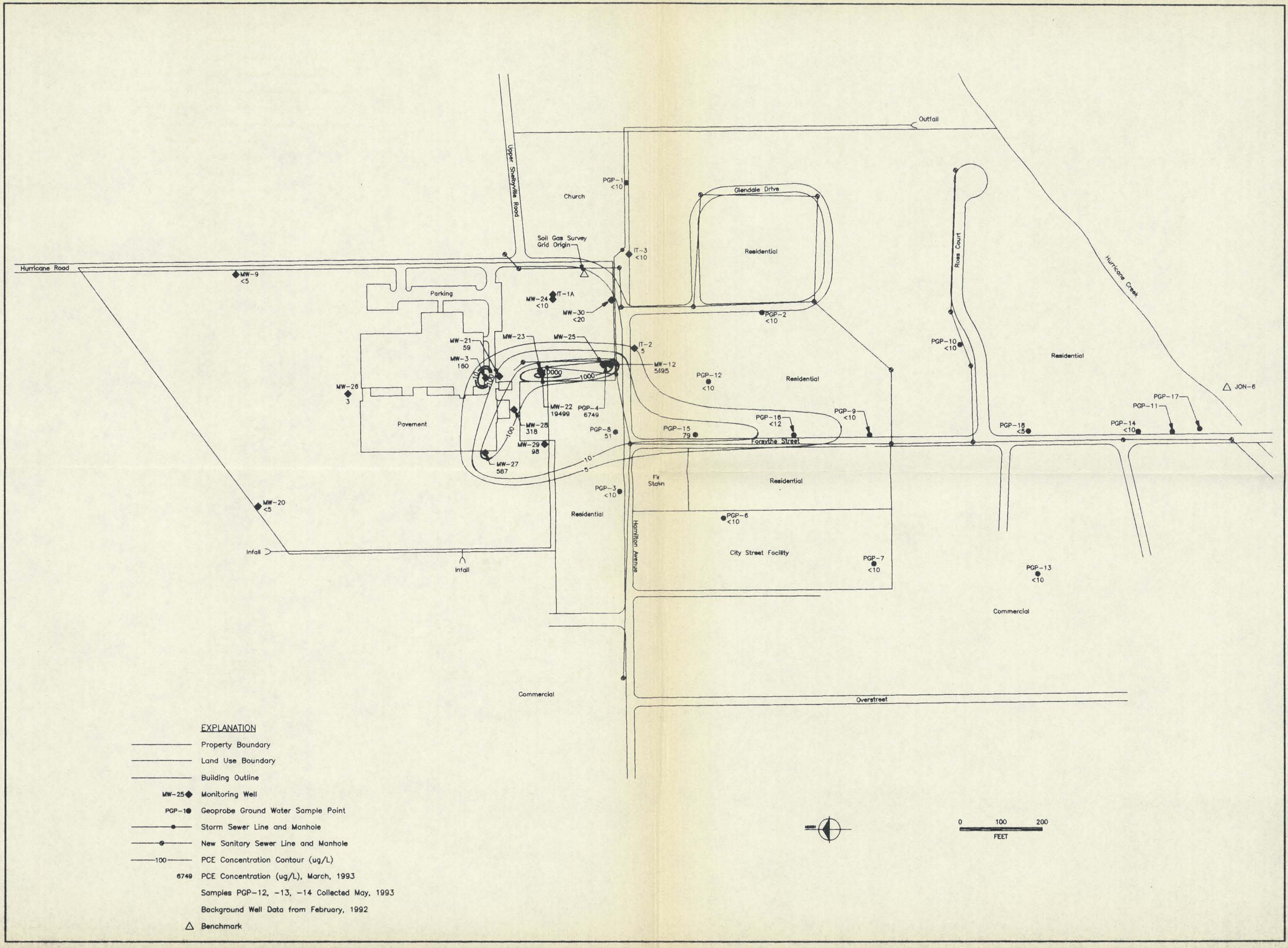
REVISED IN ACCORDANCE WITH CONSTRUCTION RECORDS BY DATE

CURTIS-FRANKLIN
FRANKLIN, INDIANA
FORMER AMPHENOL RFI/CMS

ISOCONCENTRATION MAP OF DCA IN
GROUND WATER, MARCH 1993

DESIGNED BY JK	DATE 04-22-93
DRAWN BY NW	DATE 04-22-93
CHECKED BY	DATE
FILE 7026SH6A	EDIT NW061394
SCALE	1"=100' DRAWING
	1:100 PLOT
PROJECT	07026.00

6A
SHEET NO



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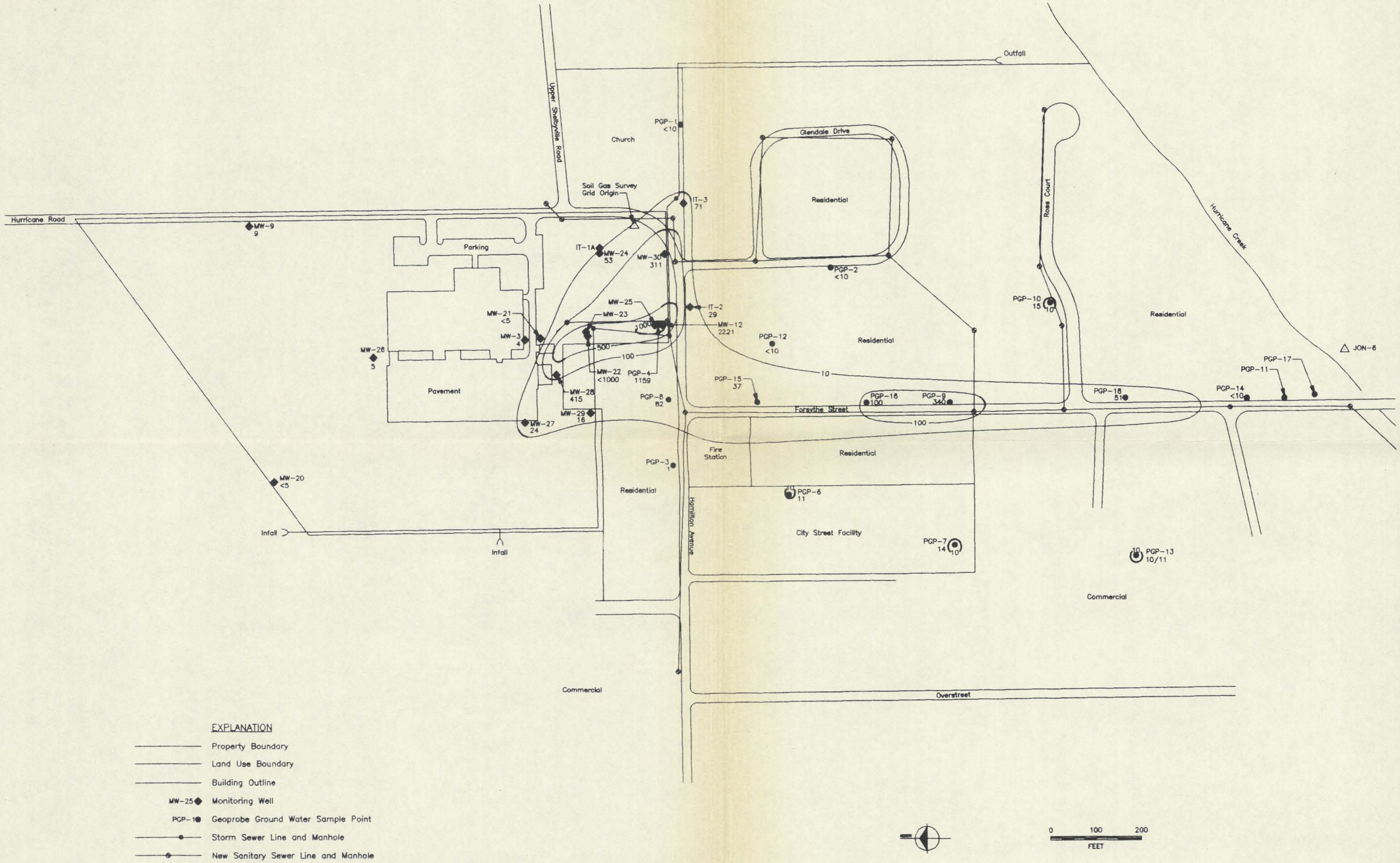
ISOCONCENTRATION MAP OF PCE IN
GROUND WATER, MARCH 1993

DESIGNED BY JK	DATE 04-22-93
DRAWN BY NW	DATE 04-22-93
CHECKED BY	DATE
FILE 7026SH6B	EDIT NWD61394
SCALE	1"=100" DRAWING 1:100 PLOT
PROJECT	07026.00

6B
SHEET NO.



EXPLANATION

Property Boundary

Land Use Boundary

Building Outline

MW-25◆ Monitoring Well

PGP-1● Geoprobe Ground Water Sample Point

Storm Sewer Line and Manhole

New Sanitary Sewer Line and Manhole

—100— TCA Concentration Contour (ug/L)

1159 TCA Concentration (ug/L), March, 1993

Samples PGP-12, -13, -14 Collected May, 1993

Background Well Data from February, 1992

△ Benchmark

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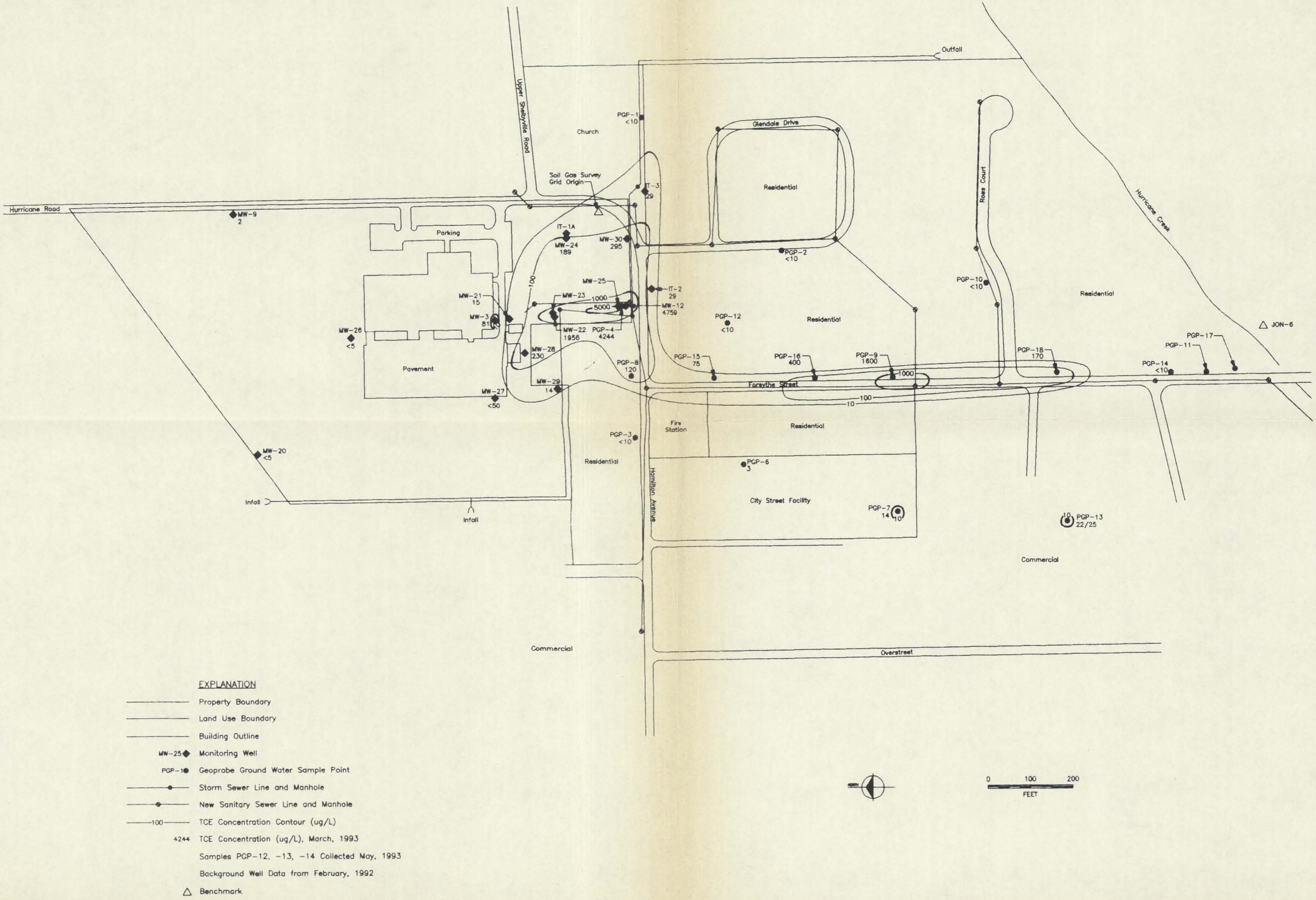
ISOCONCENTRATION MAP OF TCA IN GROUND WATER, MARCH 1993

DESIGNED BY JK	DATE 04-26-93
DRAWN BY NW	DATE 04-26-93
CHECKED BY	DATE
FILE 7026SH6C	EDIT NW061394
SCALE	1"=100' DRAWING 1:100 PLOT
PROJECT	07026.00

6C
SHEET NO.



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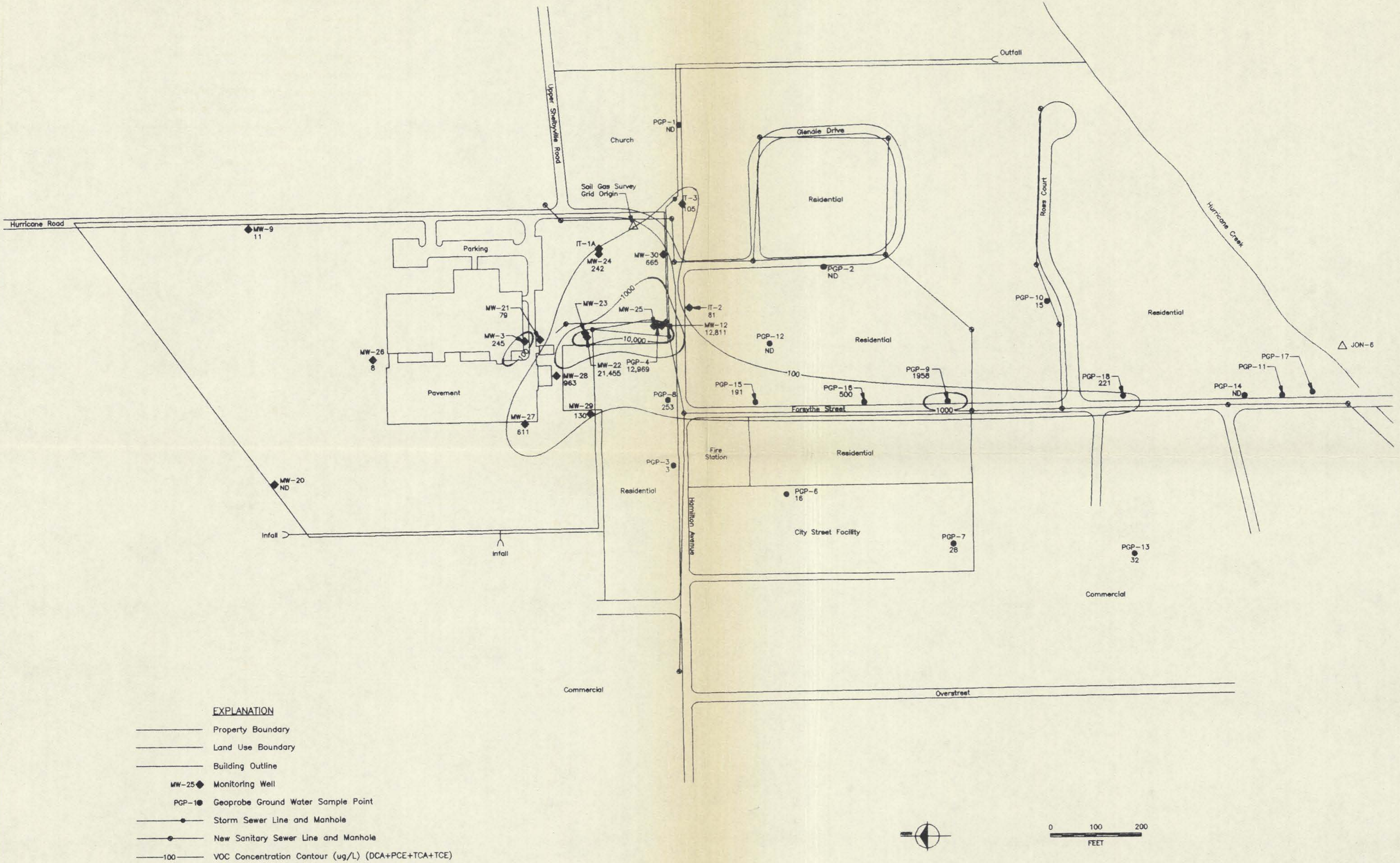
ISOCONCENTRATION MAP OF TCE IN
GROUND WATER, MARCH 1993

DESIGNED BY JK	DATE 04-22-93
DRAWN BY NW	DATE 04-22-93
CHECKED BY	DATE
FILE 7028SH6D	EDIT NW061394
SCALE	1" = 100' DRAWING 1:100 PLOT
PROJECT	07028.00

6D
SHEET NO.



EXPLANATION

- Property Boundary
- Land Use Boundary
- Building Outline
- MW-25◆ Monitoring Well
- PGP-1● Geoprobe Ground Water Sample Point
- Storm Sewer Line and Manhole
- New Sanitary Sewer Line and Manhole
- —100— VOC Concentration Contour (ug/L) (DCA+PCE+TCA+TCE)
- 817 VOC Concentration (ug/L), March, 1993
- ND No VOC Reported Above Detection Limit (See Table 8)
- Samples PGP-12, -13, -14 Collected May, 1993
- Background Well Data from February, 1992
- △ Benchmark

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ISOCONCENTRATION MAP OF TOTAL VOCs IN
GROUND WATER, MARCH 1993

DESIGNED BY JK	DATE 10-06-93
DRAWN BY NW	DATE 10-06-93
CHECKED BY	DATE
FILE 7026SH6E	EDIT NW061394
SCALE	1" =100' DRAWING 1:100 PLOT
PROJECT	07026.00

6E
SHEET NO.